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ABSTRACT

Selected papers are as follows: "Member Perceptions of the Association for International Agricultural & Extension Education" (Eaton et al.); "Historical Review of U.S. Involvement in International Agricultural Education between World War II and Enactment of Title XII" (Thuemmel, Meaders); "Educational Needs of International Graduate Students as Perceived by Graduate Faculty" (Miller, Ng); "Rethinking the Landscape" (Beilin); "Personal Networks and Agricultural Extension" (Armonia); "Extension Staff Development Program" (Trail, Malindi); "Learning Styles of Extension Personnel and the Implications for Designing Inservice Computer Training Programs" (Park, Gamon); "Agricultural Education and Global Sustainability" (Vahoviak, Etling); "Importance of Extension Education in the Post Harvest Activities of Soybean in Nigeria" (Osho); "Perceptions Regarding Agricultural Extension Education in Swaziland" (Dube, Martin); "Philosophy, Mission, and Focus of Agricultural Extension in Africa, Asia, and Latin America" (Mohamed et al.); "Educational Needs for Enhancing Non-Farm Activities and Entrepreneurship" (Singh, Comer); "Assessment of the Use of Contact Farmers in Training and Visit Extension System in Nigeria" (Omotayo, Arokoyo); "Village Extension Workers (VEWs), Agricultural Extension Officers, and Contact Farmers Perceptions of VEW Visits under the Training and Visit (T&V) System" (Radhakrishna, Yoder); "Expert Identification of Inservice Training Needs of Field Agents Working in T&V Systems of Extension" (Alawy, Safrit); "Creating a Stronger Model for International Youth Exchange" (Etling); "Perceptions Held by Secondary School Agricultural Educators in Iowa Regarding Adding a Global Perspective to the Agriculture Curriculum" (Perez-Morales, Miller); "Development of Vocational Agriculture in Swaziland" (Mndebele, Crunkilton); "Extension Serving Women Farmers" (Morrone); "Nonformal Education for Empowerment" (Nti, Etling); "Factors

Influencing Rural Women Cassava Processors' Intended Participation in an Agricultural Extension Education Program" (Ojomo, McCaslin); "Cooperative Efforts for Agricultural Extension and Rural Development" (Brewer, Meaders); "Need for U.S. and International Collaborative Rural Leadership Education for the 21st Century" (Dhanakumar et al.); "University's Role in Agricultural Development" (Cristovao, Koehnen); "Educational Needs of International Graduate Students of Extension Education" (Mohamed et al.); "Review and Synthesis of Extension Problems in Africa and Asia" (Ukaga et al.); "Development of Rural Youths through Farmers' Training and Education" (Auta, Akpoko); and "Mobilizing Rural Youths for a Career in Farming" (Arokoyo, Omotayo). (YLB)

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1994 Conference Papers

Tenth Annual Conference

24, 25, 26 March 1994
Arlington, Virginia

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AIAEE

Association for International Agricultural and Extension Education

A professional association committed to strengthening agricultural and extension education programs and institutions in countries around the world.

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1994 Conference

Refereed Papers

Tenth Annual Conference

24, 25, 26 March 1994
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Association for International Agricultural and Extension Education

ANNOUNCES
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for
Tenth Annual Conference of AIAEE

at
Arlington, Virginia

on
24, 25, 26 March 1994

Three copies of a presentation summary related to international agricultural and extension education issues should be submitted. Summary should not exceed three double spaced pages. The presentation summary may be either research-based and/or philosophical-based and should include the following:

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- **Results and/or conclusions**
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Authors of papers accepted by the referees for presentation will be notified and paper specifications mailed to them prior to the 1994 AIAEE Annual Conference.

Special Thanks to Referees

The membership of the Association for International Agricultural and Extension Education wish to express their appreciation to those who served as referees for the paper summaries submitted for the 1994 AIAEE Annual Conference. Each of the 113 paper summaries submitted was read and scored by at least two peer reviewers. Fifty papers (44%) were accepted for inclusion in this publication.

Thanks to each of you.

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1994 Annual Conference

Concurrent Sessions

25 March 1994, 8:00–9:30

Session A	ISSUES IN INTERNATIONAL DEVELOPMENT
Session B	INNOVATIVE APPROACHES TO EXTENSION
Session C	TECHNOLOGY TRANSFER

25 March 1994, 10:00–11:30

Session D	EXPERIENTIAL LEARNING APPROACHES
Session E	GLOBAL ENVIRONMENTAL CONCERNS
Session F	RESEARCH TO FARMER LINKAGES
Session G	RECONCEPTUALIZING EXTENSION

25 March 1994, 3:30–5:00

Session H	STRENGTHENING AGRIBUSINESS
Session I	TRAINING AND VISIT SYSTEM OF EXTENSION
Session J	SECONDARY AND YOUTH PROGRAMS

26 March 1994, 10:00–11:30

Session K	PARTICIPATION IN EXTENSION
Session L	INNOVATIVE UNIVERSITY PROGRAMS
Session M	MANAGEMENT OF EXTENSION

Association for International Agricultural and Extension Education

24, 25, 26 March 1994
Howard Johnson at the National Airport
Arlington, Virginia, USA

1994 AIAEE Conference
Refereed Papers

Session A ISSUES IN INTERNATIONAL DEVELOPMENT

1. **Member Perceptions of the Association for International Agricultural & Extension Education**
   Dennis W. Eaton
   Rama B. Radhakrishna
   James E. Diamond

2. **An Historical Review of U.S. Involvement in International Agricultural Education Between World War II and Enactment of Title XII**
   William L. Thuemmel
   O. Donald Meaders

3. **Verification of Crosson's Model of Development by International Program Officers**
   Lydia V. Ori
   Barbara A. Holt

4. **Educational Needs of International Graduate Students as Perceived by Graduate Faculty**
   Larry Miller
   Denise K. Ng

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   John H. Murphy

2. **A Simplified Methodology for Training Peasant Farmers How to Conduct Site-specific Scientific Field Trials in Deprived Rural Areas**
   Edward D. Ruddell

3. **Rethinking the Landscape: Catchments, Communities and the "Third World Model" of Extension in Victoria, Australia**
   Ruth Beilin

4. **Personal Networks and Agricultural Extension**
   Richardo C. Armonia

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1. **Variables Associated with Adoption and Non-Adoption of Pesticides by Plantain Farmers in the Dominican Republic**
   Thomas D. Rach
   Seung I. Na
   Curtis E. Paulson

2. **The Dairy Technology System in Venezuela**
   Rubén D. Nieto
   Janet L. Henderson

3. **Impact of Different Sources of Information on the Adoption of Pesticide Application Technology for Cotton Production in Taluka Sehwan District Dadu, Sindh, Pakistan**
   Abbasi Dur Mohammad
   Rajab Ali Memon
   Mohammad Umer
   Mohammad Yameen

4. **Linkages Between and Among Researchers, Extension Personnel and Farmers in the North West Frontier Province of Pakistan**
   Khalid Nawab
   Layle D. Lawrence

5. **Major Determinants of Adoption Behaviour Among Cocoa Farmers in Trinidad and Tobago**
   Elbert Johnson

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   Thomas Trail
   Grace Margaret Malindi

2. **Learning Styles of Extension Personnel and the Implications for Designing Inservice Computer Training Programs**
   Sung-Youl Park
   Julia Gamon

3. **Linking Vocational Agriculture to Labor Market Needs: Lessons from Swaziland Agricultural Educators**
   Comfort B. Mndebele
   John R. Crunkilton

4. **Field Attachment Programs as Perceived by Students, Lecturers, and Employers in Swaziland**
   B. M. Dlamini
   D. Gumbi
   X. P. Gobin

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1. **Agricultural Education and Global Sustainability**
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   Arlen W. Etling

2. **Environmental Concerns in Rural Pakistan**
   Mohammad Anwar
   Layle D. Lawrence

3. **Socio-economic Dimensions of Sustainable Agricultural Development: The Case of Peri-urban Agriculture in Trinidad**
   Joseph Seepersad

4. **Arresting Deforestation in the Amazon**
   Douglas Speicher
   Arlen Etling

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1. **Pesticide Use Information Flows and Competencies of Public Extension Agents in Zimbabwe**
   Raymond T. Kujeke

2. **Technology Transfer and Adoption by Small African Farmer: The Role of Research and Extension Education**
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   James Legacy
   D. S. Spencer

3. **The Importance of Extension Education in the Post Harvest Activities of Soybean in Nigeria**
   S. M. Osho

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   Musa M. A. Dube
   Robert A. Martin

2. **Philosophy, Mission and Focus of Agricultural Extension in Africa, Asia, and Latin America: Perceptions by Extension Educators and International Graduate Students of Extension Education in the United States**
   Ismail E. Mohamed
   Julia A. Gamon
   Larry D. Trede

3. **Technology Transfer or Issue Management: A Case Study with Iranian Nomads**
   Mohammad H. Emadi
   Robert A. Woog

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   Wayne Ganpat
   J. Seepersad

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   Surendra P. Singh
   Sammy Comer

3. **In Uzbekistan, Is it Farm Management or FARM *Management*?**
   James S. Long
   Andrea Luery

4. **Bulgaria's Agricultural Land Reforms**
   James E. Diamond

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1. **An Assessment of the Use of Contact Farmers in the Training and Visit Extension System in Nigeria**
   Akin M. Omotayo
   Tunji Arokoyo

2. **Village Extension Workers (VEWs), Agricultural Extension Officers, and Contact Farmers Perceptions of VEW Visits under the Training and Visit (T & V) System**
   Rama B. Radhakrishna
   Edgar P. Yoder

3. **Expert Identification of In-service Training Needs of Field Agents Working in Training and Visit (T&V) Systems of Extension**
   Abdillahi S. Alawy
   R. Dale Safrit

Session J SECONDARY AND YOUTH PROGRAMS

1. **Creating a Stronger Model for International Youth Exchange: A Case Study**
   Arlen W. Etling

2. **Perceptions Held by Secondary School Agricultural Educators in Iowa Regarding Adding a Global Perspective to the Agriculture Curriculum**
   Rigoberto Perez-Morales
   W. Wade Miller

3. **Development of Vocational Agriculture in Swaziland: Perspectives of Swaziland Agricultural Professionals**
   Comfort B. Mndebele
   John R. Crunkilton

Session K PARTICIPATION IN EXTENSION

1. **Extension Serving Women Farmers: An Analysis of the M.A.R.E. Project's Contribution to Smallholders in Malawi**
   Vicki Morrone

2. **Nonformal Education for Empowerment: The Case of the Learning Groups in Lembang, Indonesia**
   Naana O. Nti
   Arlen W. Etling

3. **Factors Influencing Rural Women Cassava Processors' Intended Participation in an Agricultural Extension Education Program**
   Christian O. Ojomo
   N. L. McCaslin

4. **"There is always another mat to weave": Invisible Women Farmers in Western Samoa**
   Ruth Beilin

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1. **Impacts of an Extension Foreign Trade Program Built on Mentoring and Teamwork**
   David Youmans

2. **The Impact of the Regional Centers for Research, Teaching, and Extension on the Educational Function of the Colegio de Postgraduados, Mexico**
   Anibal Quispe-Limaylla
   Julia A. Gamon
   W. Wade Miller

3. **Cooperative Efforts for Agricultural Extension and Rural Development: A Case Report on the Developmental Nature of the Current Michigan State University-China Connection**
   Frank L. Brewer
   O. Donald Meaders

4. **The Need for U.S. and International Collaborative Rural Leadership Education for the 21st Century: (A Case of the Wisconsin Rural Leadership Program [WRLP])**
   V. G. Dhanakumar
   Boyd Rossing
   Gerald A. Campbell

5. **The University's Role in Agricultural Development: The Missing Links**
   Artur Cristóvão
   Timothy Koehnen

Session M MANAGEMENT OF EXTENSION

1. **Educational Needs of International Graduate Students of Extension Education: Their Perceptions Compared to Those of Extension Educators in the United States**
   Ismail E. Mohamed
   Julia A. Gamon
   Larry D. Trede

2. **A Review and Synthesis of Extension Problems in Africa and Asia: Strategies for Extension Administrators**
   Okechukwu M. Ukaga
   Rama B. Radhakrishna
   Edgar P. Yoder

3. **Relationship Between Supervisory Techniques of Extension Supervisors and Organizational Outcomes in Uganda**
   Wesley E. Budke
   Paul Padde

4. **Factors Related to the Motivation of Extension Agents in Kenya's Rift Valley Province**
   J. G. Mwangi
   N. L. McCaslin

Session A ISSUES IN INTERNATIONAL DEVELOPMENT

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MEMBER PERCEPTIONS OF THE ASSOCIATION FOR INTERNATIONAL AGRICULTURAL & EXTENSION EDUCATION

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at

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Association of International Agricultural and Extension Education
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March 24 - 26, 1994

MEMBER PERCEPTIONS OF THE ROLE OF THE ASSOCIATION FOR INTERNATIONAL AGRICULTURAL AND EXTENSION EDUCATION

Dennis W. Eaton
Rama B. Radhakrishna
James E. Diamond

INTRODUCTION

A group of 32 agricultural education specialists who were keenly interested in international development, came together on 3 February 1984 at Kansas City, Missouri to organize the Association for International Agricultural Education (AIAE). The motto for this new organization was, "A professional association committed to strengthening agricultural and extension education programs and institutions in developing countries" (Thuemmel, 1985). The primary function of the organization was to provide a professional association of agricultural educators and to enhance international networking amongst the membership. Further, according to Thuemmel (1985), the organization sought to ". . . serve as a catalyst for action in associating agricultural educators around the world to bring their collective expertise to bear on the problems of human resource and agricultural development."

The organization ten years later, now named the Association for International Agricultural and Extension Education (AIAEE), has attracted membership from the agricultural and extension profession and related areas from nearly 50 different countries. The AIAEE has sought to attract membership to include students, secondary teachers, county agents, researchers, college and university faculty, administrators, consultants, staff of donor agencies, and staff of non-government and private volunteer organizations (McBreen, 1989). During the first five years of the associations' existence, the AIAEE identified the opportunity and took on the responsibility to help provide leadership in international agricultural education and development.

The leadership of professional associations must be committed to offering programs and services that are expressed by its members. By looking within the membership, the status of organizational objectives can be assessed for maintenance and adjustment. Membership surveys have been conducted by many organizations for a variety of reasons. Stenzel (1974) described the importance of the National Vocational Agriculture Teachers Association (NVATA) by writing ". . . all persons within the profession must share their interests and commonalties through support and participation in NVATA activities." A needs assessment was executed for the American School Health Association (ASHA) to gain input from the members on ways to improve the content and presentation of the annual meeting and the Journal (Weinberg, Baldi, & O'Rourke, 1981). Thompson (1992) reports that the Special Libraries Association (SLA) needs assessment survey determined ". . .the opinion, attitudes, needs of SLA's members, and to assess the prospects for certain new products and services."

It can be said that organization member surveys have been beneficial for giving direction to organizations. The periodic gathering of information about an organization from its members enlightens its leaders on member needs, interests, concerns, and opportunities for future growth. This study was conducted to determine the membership perceptions of AIAEE members regarding of the role for AIAEE and identify areas for future growth.

PURPOSE

The major purpose of this study was to access the perceptions of members regarding the role of AIAEE. Based upon the results, recommendations were made for organizational priorities and programs. The specific objectives included:

1) solicit members perceptions about various activities of AIAEE;

2) identify differences between regular members and graduate student members as they relate to role of AIAEE; and

3) determine differences between demographic characteristics and member perceptions.

METHODOLOGY

Population

The population for the study consisted of all 157 AIAEE members who paid their 1993 membership dues as documented by the AIAEE treasurer. The membership roster shows that 108 (69%) members were from the United States of America, and 49 (31%) were from other countries.

Questionnaire

A questionnaire having two sections was developed to collect data. Section one consisted of 25 statements relating to the role of AIAEE. Each statement was assigned a five-point Likert-type scale. The scale ranged from one, "strongly disagree," to five, "strongly agree." Section two consisted of items that measured selected demographic characteristics. A panel of three faculty members and one graduate student from the Department of Agricultural and Extension Education at The Pennsylvania State University judged the questionnaire to have acceptable face and content validity.

A cover letter explaining the purpose of the study and questionnaire was mailed to each subject named on the population roster. After five weeks, a total of 76 (48%) members responded to the survey. No significant differences ($\underline{p}>.05$) were found between early and late respondents on key variables examined in this study.

Statistical Analysis

For statistical analysis, the authors considered the AIAEE membership responses to represent a "slice of life" sample of the total AIAEE membership (Oliver & Hinkle, 1981). Using data provided by the respondents, a Cronbach's alpha of .84 was obtained for section one of the questionnaire. Data were analyzed using frequencies, means, percentages, and t-test.

RESULTS

Demographic Profile

The demographic profile of the 76 respondents include age, years of AIAEE membership, academic rank, experience, and citizenship. The 76 respondents indicated they had an average age of 44 years, with the youngest being 23 and oldest 67 years of age. Overall, the respondents were members of AIAEE for an average of five years.

The respondents consisted of 26 (34%) graduate students, and 50 (66%) faculty of institutions of higher learning. Twenty-three (91%) graduate students were doctoral candidates, 14 (28%) faculty were professors, ten (20%) associate professors, six (12%) assistant professors, eight (16%) instructors/research assistants or associates, and 12 (24%) others. The "other" category included deans, administrators, and coordinators. The faculty who responded had an average of 14 years of teaching experience. Seventy-two per cent of all the respondents reported they completed an international assignment.

Fifty-three (70%) of the respondents were either U.S. citizens or permanent residents while 23 (30%) were non U.S. citizens. The non U.S. citizens represented various geographic regions including Asia, Africa, Europe, Middle East, Central America, South America, and the Caribbean.

Objective One

AIAEE members were asked to indicate their level of agreement (on a scale that ranged from 1 "strongly disagree" and 5 "strongly agree") regarding the role of AIAEE. Results are presented in Table 1. Overall, members agreed that AIAEE is a major organization promoting IAD. Respondents strongly agreed that AIAEE should: promote linkages with other international organizations (4.55); maintain regular contacts with international donor agencies (4.38); identify opportunities for internships/short projects for graduate students (4.26); offer educational activities relative to IAD (4.24); make career path information available to its members (4.18); maintain a resume/CV bank of its members for possible overseas employment (4.09); and make available AIAEE proceedings to organizations and the general public on a sale basis (4.01).

Respondents also agreed that they received the AIAEE newsletter in time (3.68) and it reflected relevant issues related to international agricultural development (3.60). However, members were "uncertain" about receiving the journal (2.90) and receiving information relative to career opportunities for its members (3.21). Respondents also agreed that AIAEE should organize seminars to understand social (3.83) and economic (3.75) situations of various countries on a regular basis. Members disagreed that AIAEE represents special interest groups (2.33) and the cost of participating in the annual meetings is high (2.40). Members were "uncertain" about AIAEE providing technical assistance relative to IAD (2.84); and training programs for language acquisition (3.05).

Objective 2

As shown in Table 2, significant differences were found between regular members and graduate student members relative to: 1) career path information; 2) journal proceedings availability on sale basis; 3) cost of participating in AIAEE; and 4) disseminating information to general public. The perception scores of graduate student respondents were significantly higher than regular member respondents.

Objective 3

No differences were found between demographic characteristics (age, education, academic rank, and years of experience) and perceptions of respondents. However, respondents who were not U.S. citizens and who had not completed an international assignment significantly differed in their perceptions relative to the role of AIAEE. As shown in Table 3, members who were not U.S. citizens significantly differed in their perceptions relative to: 1) providing technical assistance; 2) offering educational activities; 3) career path information; 4) informing member about career opportunities in IAD; 5) training programs relative to language acquisition and cross-cultural protocol; and 6) in

Table 1. Means, standard deviations and rankings of member perceptions regarding the role of AIAEE (N=76)

Perception	Mean*	SD	Rank
AIAEE:			
Should promote linkages with other international organizations	4.55	0.53	1
Should maintain regular contacts with international donor agencies	4.38	0.73	2
Should identify opportunities for internships/short projects for students interested in IAD	4.26	0.79	3
Should offer educational activities relative to IAD	4.24	0.81	4
Should make career path information available to its members	4.18	0.89	5
Make AIAEE journal/proceedings available to organizations and general public on sale basis	4.01	0.88	6
Should maintain a resume/CV bank of its members for possible overseas employment	4.09	0.95	7
Should promote linkages with non-formal programs such as 4-H	3.95	0.99	8
Should offer programs to understand the social situations around the world	3.83	1.00	9
Should provide training to its members regarding cross-cultural protocol	3.81	1.08	10
Should sponsor a press conference at annual meeting	3.79	0.92	11
Should organize programs to understand the economic situations around the world	3.75	1.01	12
Sends out its newsletter in a timely manner	3.68	0.80	13
Encourages members to conduct research relative to IAD	3.65	0.98	14
Mission should include dissemination of information of IAD to the general public	3.63	1.06	15
Should serve as clearinghouse for employment opportunities in IAD	3.62	1.18	16
Newsletter reflects relevant issues in IAD	3.60	0.84	17
Should organize programs to understand the political situations around the world	3.51	1.10	18
Informs its members about activities in IAD	3.30	1.11	19
Informs its members about career opportunities in IAD	3.21	1.21	20
Should offer training programs relative to language acquisition	3.05	1.28	21
The cost of participating in the AIAEE annual meeting is too high for: Graduate students	2.97	1.32	22
Regularly sends out its journal	2.90	1.29	23
Provides technical assistance relative to IAD	2.84	0.89	24
Represents only special interest groups within the membership	2.43	1.07	25
The cost of participating in the AIAEE annual meeting is too high for: Regular members	2.42	1.04	26

* Mean computed on a scale that ranged from 1 (strongly disagree) to 5 (agree).

Table 2. Comparison of graduate student member and regular member perceptions regarding role of AIAEE.

Perception	**Student** N=26		**Regular** N=50		
	Mean	**SD**	**Mean**	**SD**	**T Value**
Should make career path information available to its members	4.58	.59	4.04	.87	3.16*
Should make AIAEE journal/proceedings availability on sale basis	4.46	.65	3.92	.84	2.86*
Should sponsor press conference at annual meeting	4.11	.95	3.66	.79	2.20*
Cost of participating in annual meetings is high for graduate students	3.75	1.56	2.57	.97	3.41*
Cost of participating in annual meetings is high for regular members	2.83	1.02	2.17	.94	2.66*
Mission should include dissemination of information on IAD to general public	4.07	.80	3.44	1.07	2.67*

* significant at .05 level

Table 3. Comparison of U.S. citizens and non U.S. citizen members perceptions regarding the role of AIAEE.

Perception	**U.S. Citizen** N=53		**Not a-U.S. Citizen** N=23		
	Mean	**SD**	**Mean**	**SD**	**T Value**
Provides technical assistance relative to IAD	2.70	.85	3.17	.94	-2.18*
Should offer educational activities relative to IAD	4.06	.86	4.65	.49	-3.09**
Should make career path information available to its members	4.00	.94	4.61	.58	-3.43*
Informs its members about career opportunities in IAD	2.92	1.09	3.96	1.19	-3.69**
Should provide training to its members regarding cross-cultural protocol	3.61	1.10	4.26	.91	-2.45*
Should offer training programs relative to language acquisition	2.77	1.25	3.69	1.15	-3.04*
Should promote linkages with other international organizations	4.47	.54	4.74	.45	-2.08*
Cost of participating in annual meetings is high for regular members	2.22	1.02	2.86	1.04	-2.49*

* significant at .05 level; ** significant at .001 level

promoting linkages with other international agencies. The perception scores of non U.S. citizens were higher than U.S. citizens.

As shown in Table 4, significant differences were found between members who had completed an international assignment and who had not relative to 14 statements: 1) newsletter reflects relevant issues in IAD; 2) providing technical assistance; 3) career path information; 4) maintain resume/CV bank of members for employment overseas; 5) offer programs relative to social, economic and political situations around the world) journal proceedings availability on sale basis; 6) cost of participating in AIAEE; and 7) disseminating information to general public. 8) offering educational activities; 9) informing member about career opportunities in IAD; 5) training programs relative to language acquisition and cross-cultural protocol; and 6) in promoting linkages with non-formal programs such as 4-H. For all these statements, the perception scores of members who had not completed an international assignment was higher that those who had not completed an international assignment.

RECOMMENDATIONS

Based upon the purpose and objectives of this study, and the analysis of data, the following recommendations are offered.

1. The AIAEE board should explore possibilities of developing linkages with various organizations involved in international agricultural development (IAD). Such linkages will help AIAEE to broaden its scope and activities. This can be achieved in several ways. For example, inviting other organization members on the AIAEE board and vis-a-vis; inviting representatives of international organizations for the annual meeting, make efforts to explore joint collaboration of activities. In addition, such linkages may help identify potential internships or short term projects for graduate students and faculty.

2. Findings of this study suggest that AIAEE members need information regarding employment opportunities in IAD. As more faculty and graduate students are involved in IAD, a need exists for AIAEE to play an active role in helping its members identify possible employment opportunities. Members responding to this study, strongly felt that AIAEE should serve as a "clearing house" to identify possible overseas employment.

3. Understanding economic, political and social situations of other countries has become increasingly important for agricultural and extension educators who are becoming more active in IAD. Information on economic and political situations are easily available in literature. But information relative to social and cultural aspects are not only scarce, but lacks substance and experience. Therefore, it is recommended that AIAEE should include in their program during annual meetings a section on understanding social and cultural situations. Experts from other countries, graduate students and faculty who had recently completed an international assignment can be excellent resources for organizing such programs.

4. While the annual meeting provides an important forum for disseminating information on IAD, greater emphasis should be placed on other avenues, such as the journal and newsletter. In this regard, an effort should be made by the journal editorial board and AIAEE officers to initiate a more active publications development program to serve AIAEE membership. This has become very important as agricultural education faculty are devoting more of their time to extension education (19%) and international (9%) (Bowen, Radhakrishna, and Jackson, 1991).

Table 4. Comparison of AIAEE members who had and who had not completed an international assignment regarding the role of the AIAEE.

	International Assignment N=51		No international Assignment N=20		
Perception	Mean	SD	Mean	SD	T Value
Newsletter reflects relevant issues in IAD	3.41	.83	4.00	.74	-2.71*
Provide technical assistance relative to IAD	2.65	.87	3.10	.72	-2.07*
Should make career path information available to its members	3.98	.94	4.55	.60	-3.01*
Should maintain a resume/CV bank of its members for overseas employment	3.90	.99	4.45	.67	-2.26*
Should provide training to its members regarding cross-cultural protocol	3.56	1.09	4.25	.97	-2.47*
Should offer training programs relative to language acquisition	2.60	1.19	3.95	.94	-4.51**
Should offer programs to understand social situations around the world	3.54	1.01	4.45	.67	-3.96**
Should offer programs to understand economic situations around the world	3.45	1.02	4.45	.60	-5.06**
Should offer programs to understand political situations around the world	3.23	1.14	4.15	.74	-3.96**
Should promote linkages with non-formal programs such as 4-H	3.82	1.07	4.25	.64	-2.06*
Should identify internship opportunities or short term projects for students	4.06	.83	4.65	.49	-3.69**
Should sponsor press conference at annual meeting	3.60	.95	4.10	.72	-2.12*
Cost of participating in annual meetings is high for regular members	2.69	.98	2.88	1.05	-2.506*
Mission should include dissemination of information on IAD to general public	3.39	1.04	4.00	.97	-2.25*

* significant at .05 level; ** significant at .001 level

5. Publicizing the activities of the organization becomes very crucial for the organization to move forward. It helps to develop linkages with other organizations having similar goals and interests. As expressed by a majority of the respondents in this study, AIAEE should explore opportunities to publicize its activities through media and other possible media. Such publicity and wider dissemination of AIAEE efforts may help create awareness and develop linkages with other organizations for possible cooperation and collaboration.

6. Considerable debate has taken place within AIAEE membership regarding the cost of participating in the annual meeting. Graduate students have complained about the high cost of participation and is again evident from the findings of this study. Regular members do not feel that the costs are high. Therefore, there is a need to examine how and in what ways can the costs for graduate students can be reduced.

EDUCATIONAL IMPORTANCE

The results and recommendations in this study have several implications for the future directions of AIAEE. This study penetrated member thinking and collective results were reported. These findings can be considered baseline data for 1993 regarding member perceptions of the role of AIAEE. The recommendations offer guidelines for future AIAEE leadership and can govern program planning and development.

This study reflected the programs and services AIAEE should offer as perceived by its members. When these recommendations are implemented, there is a potential for improved communications, participation by members, membership growth, linkages with other organizations and agencies, publications, program planning, career information dissemination, and wider recognition by domestic and foreign governments.

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AN HISTORICAL REVIEW OF U.S. INVOLVEMENT IN INTERNATIONAL AGRICULTURAL EDUCATION BETWEEN WORLD WAR II AND ENACTMENT OF TITLE XII[1]

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INTRODUCTION

American military and political activity overseas was relatively insignificant until after the American Civil War. Foreign economic assistance from the United States was relatively rare until after World War II. Historically, the United States has experienced periodic bouts of active international involvement followed by periods of isolationism. Involvement in international agricultural education, in contrast, has evolved slowly but steadily since World War II.

The roots of international involvement by U.S. agricultural educators can be traced to William S. Clark's mission to Japan in 1876 to establish Sapporo Agriculture College (now Hokkaido University) on Hokkaido. However, except for work as agricultural missionaries, international activity by U.S. agricultural educators remained relatively dormant for the next 75 years--until the reconstruction efforts following World War II. The three-decade period between the end of World War II in 1945 and enactment of Title XII (the International Development and Food Assistance Act of 1975) was an era characterized by the evolution of several U.S. international assistance programs--the Marshall Plan, Point IV, the Alliance for Progress, and others. This period also ushered in the Agency for International Development and the U.S. Peace Corps. These activities and events provided the institutional incentives for agricultural and extension educators to apply their professional talents internationally.

PURPOSE

The major purpose of this study was to review the literature relevant to U.S. international activity in agricultural and extension education that was published between 1945 and 1975. Following a brief historical review of international precursors to this three-decade era, the authors reviewed post-World War II literature to assess the scale and nature of international involvement by U.S. agricultural educators to define professional issues and to identify trends where discernible. Implications for international agricultural and extension education in the future are also drawn.

METHODOLOGY

Using qualitative research methods, the authors reviewed and analyzed literature that chronicled international activities by U.S. agricultural educators between 1945 and 1975. Primary sources included all issues of The Agricultural Education Magazine, the AATEA (American Association of Teacher Educators in Agriculture) Newsletter, The Journal of the American Association of Teacher Educators in Agriculture (now the Journal of Agricultural Education), and the American Vocational Journal (now Vocational Education Journal) that were published during this period. Other useful references were notes from annual meetings of AATEA and various technical reports and publications. The historical contexts for the events and activities were emphasized throughout the paper. Quantitative assessments of international activity were made where appropriate.

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[1] A paper presented at the 10th Annual Conference of the Association for International Agricultural and Extension Education, Arlington, Virginia, March 24-26, 1994.

FINDINGS AND DISCUSSION

Quantitatively and qualitatively, agricultural educators were quite actively involved in international assignments and related activities during the period of review. International articles ranged from editorials on the need for agricultural educators to take a world view of their profession, to reports of sabbaticals and assignments overseas, to exchanges between domestic and international agricultural educators. Most international activity involved assignments of agricultural educators in developing countries. During the decade following World War II, several "views from abroad" articles appeared in The Agricultural Education Magazine.

A total of 144 articles, overseas assignment announcements, and related items about U.S. involvement in international agricultural education were published in The American Education Magazine during the 30 years following World War II. Although the mean number of items published per year was only 4.8, the pattern was varied. The five-year periods of the late 1940s and late 1960s had the smallest numbers of international items published in the Magazine (11 and 13 respectively); whereas, the early '60s and '70s had the largest quantities of items published (36 and 35 respectively). A tabular summary of these and comparable data from the three other publications reviewed is presented in Table 1.

The AATEA Newsletter (American Association of Teacher Educators in Agriculture) began publication in 1967. More than twice as many international items appeared during the period 1971-1975 (69 items) as in 1967-1970 (27). This contrast for the two periods covered by the AATEA Newsletter paralleled the pattern of activity reported for The Agricultural Education Magazine.

A third primary source reviewed was the Journal of the AATEA. Volume 1 of the Journal was published in 1961. A review of the table of contents of all issues published through Volume 16 (1975) revealed only eight articles with an international focus. Three articles were published in the first five years, 1961-65; and five articles in the next period, 1966-70.

The American Vocational Journal was the fourth and final periodical reviewed for items related to international involvement by U.S. agricultural educators. A review of Volume 20 (1945) through Volume 50 (1975) indicated a steady flow of varied international references (articles, convention program notes, people on assignments abroad, etc.) were published during the three decades involved.

Table 1
Quantitative Summary of International Agricultural Education References in Selected Publications, 1945-1975

Five-year Period	Ag. Ed. Magazine	AATEA Newsletter	Journal of AATEA	Am. Voc. Journal	Combined Totals
1946-1950	11	--	--	21a	32
1951-1955	24	--	--	19b	43
1956-1960	25	--	--	27	52
1961-1965	36	--	3	17	56
1966-1970	13	27c	5	8	53
1971-1975	35	69	0	8	112
Totals	144	96	8	100	348

a Includes 1945.
b Volume 26 (1951) was not available for review.
c Volume 1 was published in 1967.

World War II Ends/Reconstruction Begins

With the unconditional surrender of Germany and Japan in 1945, World War II ended. The victorious nations first celebrated, then reflected on events that led up to the war. Energies were soon directed toward reconstruction, both at home and abroad. These reported international activities and thoughts by U.S. agricultural educators over the next two decades were chronicled primarily in The Agricultural Education Magazine and the American Vocational Journal.

C. S. Anderson (1945; April, 1947), an agricultural teacher educator from Pennsylvania State College (now University), was one of the first members of his profession to travel abroad and describe the devastation from the war. In 1945, Anderson was granted a leave of absence to serve in Europe as an agricultural rehabilitation specialist with the United Nations Relief and Rehabilitation Administration (UNRRA). He spent most of his 18-month assignment working with the Polish Government of National Unity. Writing in the March 1946 issue of The Agricultural Education Magazine, Anderson (1946) reported: "Before the war Poland had 350 intermediate schools in which agriculture was taught. There have been no schools, except underground, for the past five and one-half years. Every school building in Warsaw is a pile of rubble" (p. 165). After returning from his UNRRA assignment, Anderson (January, 1947) shared his experience with the FFA chapter officers of Fawn Grove, Pennsylvania, their chapter advisor, and area vocational supervisor. They were so moved by Dr. Anderson's description of human suffering, the Fawn Grove FFA Chapter financially adopted a 14-year-old Czechoslovakian boy, orphaned by the war, through the Foster Parents' Plan for War Children.

Another early post-war chronicler from abroad was Dr. Sherman Dickinson, Head of the Agricultural Education Department, University of Missouri. Dickinson (1946) served on assignment to Brazil as consultant and specialist in agricultural education and as Chief of Party, Brazil Cooperative Agriculture Program, in 1946 and 1947. In an article in The

Agricultural Education Magazine, Dickinson (1947) wrote: "Agricultural education, what little there is of it, is conducted almost exclusively under the supervision of the Ministry of Agriculture" (p. 237). He worked with the MOA to upgrade existing agricultural education programs (elementary through adult levels) offered at practical agricultural schools in the rural areas of Brazil.

H. M. Hamlin (1947) presented the readership of The Agricultural Education Magazine with an introspective, philosophical article on the need to educate farm people for their part in national and world affairs. Hamlin felt that farmers had become politically empowered following the war. That:

> Teachers of agriculture are the only teachers in our schools who work extensively with adult farmers, the farmers who will make the critical decisions these next few years...Teachers of any consequence have a general influence upon the thinking of those they teach. Furthermore, it is within the field of agriculture that some of the gravest decisions affecting world and national conditions will have to be made. (p. 9)

Hamlin (1947) stressed the importance of free trade in maintaining world peace. He challenged teachers to encourage farmers to examine their commitment to improving world trade and related international issues, noting that U.S. farmers by commission or omission "may have had about as much to do with causing the last war as any other group" (p. 18) through their support for such policies as U.S. refusal to join the League of Nations and enactment of the Smoot-Hawley tariff law. Both events occurred before Hitler rose to power. In contemporary terms, Hamlin most likely would have been an advocate for the recently enacted North American Free Trade Agreement, or at the least would have recommended that teachers of agriculture educate their students about the pros and cons of such an important international issue.

Three significant programs were created during the late 1940s that encouraged international involvement by U.S. agricultural educators. The first was the Fulbright Act of 1946, which provided for an exchange of students and teachers between the United States and other countries. The second was the Marshall Plan (1948-1952), a program that facilitated the reconstruction of Western Europe and Japan by providing capital investment and construction material. The third was the Point IV Program (enacted in 1950), the first such U.S. program to extend technical assistance to other countries--in this case, to underdeveloped areas. According to Compton (1989), the Point IV Program was initially administered by the U.S. Technical Cooperation Administration (TCA), which became the U.S. International Cooperation Administration (ICA), and, in 1961, the Agency for International Development (USAID).

The authors found only six published references of U.S. agricultural educators participating in the Fulbright program prior to enactment of Title XII. The six included--Harold S. Tate, Philippines, 1951; C. S. Anderson, United Kingdom, 1952; Milo J. Peterson, Japan, 1956; Theodore Buila, Yugoslavia, 1971-72; Gordon I. Swanson, Germany, 1973; and George Copa, Portugal, 1975.

Only one reference was located that specifically linked U.S. agricultural educators to the Marshall Plan. According to a "Personals" section in the American Vocational Journal

(1950):

> Paul E. Miller, Director, Minnesota Agricultural Extension Service, left the United States on January 14th to survey farming conditions in the Marshall Plan in Europe. The international agriculture committee on which Mr. Miller is serving also includes Dean A. L. Derring, Director, Maine College of Agriculture, and A. H. Maunder, Nebraska Agricultural Extension Supervisor... (p. 29)

Henry G. Bennett, Administrator, TCA, discussed the impact of the Point IV Program at the 1951 convention of the American Vocational Association. According to Bennett (1952), "The Point 4 Program is education from the first to last. Vocational educators are in the vanguard as we share our technical know how with our brothers (and sisters) in all parts of the world" (p. 8). In the 11 years between implementation of Point IV and establishment of USAID in 1961, at least 21 overseas assignments of U.S. agricultural educators were funded by Point IV and/or administered by TCA or ICA and were reported in the references reviewed. The typical overseas assignment was for two years. Only one assignment involved an African country during this period--to the Belgian Congo (now Zaire) in 1954.

A total of 42 international assignments by U.S. agricultural educators were undertaken between 1945 and 1961 and reported in the publications reviewed. At least eight of those individuals were agricultural education specialists (state supervisors) in their state department of education (SDE) at the time of their overseas assignment. However, the authors found no reference to SDE agricultural education specialists on international assignments between 1955 and 1975. One must realize that perhaps most international assignments by U.S. agricultural educators were not published in agricultural education periodicals. The observation by C. S. Anderson (1961) was probably accurate:

> In 1956 when we were recruiting agricultural specialists for a university-sponsored I.C.A. project in the Far-East, we estimated that 500 or more Americans with background experiences as teachers of Vocational Agriculture were then abroad as members of various foreign aid groups, for example, I.C.A., F.A.O., Near-East Foundation, Ford Foundation, Rockefeller Foundation, and others. Today the number is certainly no fewer. (p.75)

From The Kennedy Years Until Enactment of Title XII

The election of President John F. Kennedy brought a wave of American idealism to the developing nations. During 1961, Kennedy's first year in office, the Peace Corps, the Alliance for Progress, and the U.S. Agency for International Development all were established. The potential for international opportunities for U.S. agricultural educators and other development specialists was enhanced. The data presented earlier for 1961-1965 (in Table 1) reflect increased international interest and activity among U.S. agricultural educators over previous five-year periods. Between 1961 and 1975, there were 70 international assignments by U.S. agricultural educators reported in the publications reviewed; 70 percent more than the 41 found in the references published during the previous 15 years.

The 70 overseas assignments reported between 1961 and 1975 included agricultural educators from at least 18 U.S. universities and colleges. Approximately one-third of those assignments were to countries in Asia, one-quarter to Africa, one-quarter to Latin America and the

Caribbean, one-tenth to Oceania, and the balance to Europe. Sponsoring agencies were not always identified (one-fourth were not) in the published announcements. However, USAID was the one most commonly mentioned (14). The Food and Agriculture Organization of the United Nations (FAO) was cited next (8). The other sources identified included a variety of sponsoring agencies--the Near East Foundation, World Bank, Peace Corps, Ford Foundation, various church organizations, and several others.

Growing international involvement by U.S. agricultural educators during this 15-year period was evidenced in a variety of ways. In addition, to an increase in overseas assignments, a number of articles were written by exchange students and faculty members from other countries and published in The Agricultural Education Magazine. Articles regarding the establishment of organizations similar to the FFA in other countries (e.g., Colombia and Japan) appeared in The Magazine. Several reports of U.S. participation in international conferences on agricultural education were published in The Magazine--Milo J. Peterson (1970) discussed his views about the First World Conference on Agricultural Education in Copenhagen in August 1970. In his article, Peterson noted that the regional paper for North America at the Conference was prepared by Gordon I. Swanson, a fellow agricultural educator from the University of Minnesota. Raymond J. Agan (1971), Kansas State University, provided a review of his participation in a UNESCO-sponsored Latin American Conference on Agricultural Education in May 1970.

The Agricultural Education Magazine published its first theme issue on international agricultural education in May 1965. Dr. Harry W. Kitts (1965), teacher educator, University of Minnesota, wrote the guest editorial. Kitts advised his readers as follows:

> The consultant, or technician, who goes abroad should keep in mind that he is the catalyst to get action started and to help it continue. He must be careful on two points. First, he should work in such a manner that the action will continue after his influence is withdrawn. Second, he must realize he is the "foreigner with queer ideas." He himself may think their methods are odd, but he must remember that their leaders do not recognize these methods as unusual in their society. His position, in most cases, is to help the recipient adapt, not adopt, workable techniques. (p. 267) [Ed. note: Hopefully, Professor Kitts would not have been as gender specific if writing today!]

A second international issue of The Agricultural Education Magazine was published a decade later, in October 1975, the same year as the International Development and Food Assistance Act of 1975 was passed by the 94th U.S. Congress. This federal legislation was intended to increase the capacity of the land-grant and other U.S. universities to increase food production in developing countries. Title XII would provide another boost for international involvement by U.S. agricultural educators in the years that followed.

The first issue of the Journal of AATEA contained only one article, an edited version of the address given by Harold M. Byram, in which one of the stated challenges to the meeting of agricultural teacher educators was to help new leaders possess "... understandings and competency in international education" (p. 8). He went on to challenge the teacher educators to learn how to work with professionals from other cultures and to be able to effectively communicate to them the essence of educational philosophy within the American culture.

Another substantive challenge to American agricultural teacher educators was given by Gordon Swanson in 1966, the year of the 20th anniversary of UNESCO, He reported in the November 1966 issue of the AATEA Journal on the long standing conflict in recommendations about agricultural education given to developing countries by FAO and UNESCO representatives, and the recently passed resolution by UNESCO. Swanson described the resolution by comparing it in importance internationally to the importance of passage of the Smith-Hughes Law to the field of agricultural education in the United States (p.1). Some insights to the controversy as described by Swanson were as follows:

> For 20 years, agricultural education has been a field of controversy among the Specialized Agencies of the United Nations....FAO has used its influence to discourage countries from establishing agricultural instruction programs within the educational framework of general and normative educational systems....UNESCO has insisted that a casual approach was insufficient and that agricultural education was too important to be omitted from the contributions which an educational system must make to the development process....There is little time left for argument. The world food problem is no longer hypothetical. Worse, agricultural development during the "development decade" (1960-1970), has had few innovations and little success. (p.1)

CONCLUSIONS

The 30-year period covered by this review of selected publications for information about the reported roles and activities of agricultural educators, has been a means of understanding where we have been. First, it must be mentioned that the review has been limited to publications which reported on and about personnel involved in agricultural teacher education and vocational education in agriculture programs. The roles and work of professional agriculturalists such as agronomists, agricultural engineers, soil scientists, and others has not been touched by this review.

Second, the early work, although somewhat with policy level officials in governments, often appeared to be more focused on individual institutions such as schools and colleges. The work appeared to most often, in the early years, to be carried out by individuals not as members of teams. Later, there did appear to be a shift to activities which were more team oriented and more related to policies about agricultural education.

Third, there was strong evidence of the beginnings of debate about theories of development, not necessarily within the agricultural teacher education groups, but by those who eventually provided the funding for projects dealing with agricultural education. The period was punctured by major international events such as the outbreak of the Korean conflict, the launching of Sputniks, the Vietnam War, and the explosion of an H bomb by the Chinese. These and other major events left their impact on the international agricultural education efforts.

EDUCATIONAL IMPORTANCE

This paper contributes to the historical foundation and understanding of how and why international agricultural education has evolved as an area of professional specialization. An historical perspective helps to document events that have eventually culminated in the establishment of the Association for International Agricultural and Extension Education

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(AIAEE). Some insights were gained regarding the changing/broadening role for agricultural educators. By a better understanding of where we have been, we can make better plans for the future--organizationally and professionally.

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VERIFICATION OF CROSSON'S MODEL OF DEVELOPMENT BY INTERNATIONAL PROGRAM OFFICERS

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INTRODUCTION

Environmental deterioration of natural resources threatens the long-term sustainability of agricultural systems on which much of the world's food supply depends. In both developed and developing countries agricultural development aims toward increased productivity to obtain adequate food supplies and minimize expenditures through improved technology. However, many researchers have noted negative impacts of modern agricultural technology on society and environments.

Crosson, in 1983, developed a model which focussed on the interaction among resources, technologies and the environment in agricultural systems and on their consequences for long-term agricultural development. He placed countries in categories based on agricultural productivity and land potential.

PURPOSE AND OBJECTIVES

The purpose of the study was to verify Crosson's theoretical model of development. Specific objectives in the study were to: (1) determine international Program Officers' perceptions of placement of countries in productivity potential and agricultural land potential categories as hypothesized by Crosson; (2) validate Crosson's model; (3) determine if relationships existed between international Program officers' placement of selected countries in categories theorized by Crosson and their (a) most recent types of international field experiences, and (b) work levels during their most recent field experience.

METHODOLOGY

The study utilized a descriptive survey research methodology. The population for this study was a census of all international program officers affiliated with the Board of International Food and Agricultural Development (BIFAD). The questionnaire utilized for this study was developed by the researchers. Face and content validity were established by a panel of experts in international agriculture at the Louisiana State University.

The instrument consisted of two parts. Part I was designed with closed ended questions and gathered information on perceptions of international program officers regarding the placement of agricultural systems of specific countries into categories as hypothesized by Crosson. The second part of the questionnaire contained demographic data and questions related to participants' experiences gained on their international assignments. The data were analyzed using descriptive statistics. Data were collected during Spring, 1991. Of the 157 questionnaires mailed, 103 were returned. Eleven of the questionnaires were unusable, resulting in a usable sample of 92 (58.6%). A telephone follow-up of non-respondents was conducted and resulted in 21 responses. Statistical analysis revealed that the respondents in the study were not different from the non-respondents, so answers from respondents were considered representative of non-respondents.

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RESULTS

Objective 1

The first objective of this study was to determine the perceptions of respondents regarding placement of countries in productivity potential and agricultural land potential categories as hypothesized by Crosson in 1983. Based on his experiences in international agricultural development, Crosson theorized four categories. He characterized Australia, Canada, and the United States as category I countries; Argentina, Brazil, and the Sudan as category II countries; China, India, and Indonesia as category III countries; and Hungary, France, and West Germany as category IV countries.

Respondents in this study were asked to place each of the twelve countries taken from Crosson's theory in one of four categories as explained above. A fifth, nonapplicable category was provided for participants who were not confident in making judgement or who thought a country did not belong in any of Crosson's categories (refer to Table 1). About 35 of the 92 respondents placed Australia, Canada and the United States in category II, (High Productivity Potential/High Agricultural Land Potential). Less than 20% of the respondents placed each of these countries in the Crosson's category I (Low Productivity Potential/High agricultural Land Potential).

More than 50 % of the respondents' placement of Argentina and Brazil in category II was consistent with Crosson's placement. Almost one-third of the respondents placed Sudan in the nonapplicable category, while only fifteen (18.1%) of the respondents agreed with Crosson's placement of Sudan in category II.

China, India, and Indonesia were countries that, according to Crosson, fit category III (High Productivity Potential, Low Agricultural Land Potential). More than one-third of the respondents agreed with the Crosson's placement of China and India, but more placed Indonesia in the nonapplicable category or in category II than in category III. However, for all three countries, the majority of the respondent's disagreed with Crosson's placement.

France, Hungary, and West Germany were countries belonging in Crosson's category IV (Low Productivity Potential/Low Agricultural Land Potential). France, Hungary and Germany were placed by the respondents more in categories II and III than in category IV or in the nonapplicable category. Only 10 (12.3 % or fewer respondents placed France, Hungary and Germany in category IV (Table 1).

Objective 2

The validation of Crosson's model was based on a criterion established by the researchers that at least 50% of the respondent's placement of countries in categories I through IV should be in agreement with Crosson's placement. To accept or reject Crosson's theory regarding the placement of countries in categories based on agricultural productivity and land potential the following research hypotheses were formulated:

HO_2 Respondent's placement of countries in agricultural productivity and land potential categories will agree with Crosson's placement.

$HO_{2.1}$ At least 50% of respondents will agree that Canada, Australia and the United States are category I countries.

$HO_{2.2}$ At least 50% of respondents will agree that Argentina, Brazil and the Sudan are category II countries.

$HO_{2.3}$ At least 50% of respondents will agree that China, India, and Indonesia are category III countries.

$HO_{2.4}$ At least 50% of respondents will agree that France, Hungary and West Germany are category IV countries.

Table 1. **Respondents' Placement of Twelve Selected Countries in Crosson's Model (N=92)**

Countries	I n %	II n %	III n %	IV n %	NA n %	NR n %
Respondent's placement of category I countries						
Australia	8 9.9	35 43.2	11 13.6	8 9.9	19 23.4	11 --
Canada	11 13.4	34 41.5	13 15.8	10 12.2	14 17.1	10 --
United States	16 19.5	34 41.5	18 21.9	5 6.1	9 11.0	10 --
Respondents' placement of category II countries						
Argentina	6 7.3	46 56.1	4 4.9	3 3.7	23 28.0	10 --
Brazil	10 12.2	47 57.3	6 7.3	4 4.9	15 18.3	10 --
Sudan	10 12.0	15 18.1	13 15.7	18 21.7	27 32.5	9 --
Respondents' placement of category III countries						
China	7 8.5	22 26.8	28 34.1	9 11.0	16 19.6	10 --
India	5 6.2	16 19.8	36 44.4	6 7.4	18 22.2	11 --
Indonesia	8 9.9	22 27.2	21 25.9	4 4.9	26 32.1	11 --
Respondents' placement of category IV countries						
France	8 9.9	25 30.9	21 25.9	9 11.1	18 22.2	11 --
Hungary	5 6.2	22 27.2	17 20.9	6 7.4	31 38.3	11 --
West Germany	6 7.4	26 32.1	22 27.2	10 12.3	17 21.0	11 --

[a]Categories:
I = Low Productivity Potential/High Agricultural Land Potential
II = High Productivity Potential/High Agricultural Land Potential
III = High Productivity Potential/Low Agricultural Land Potential
IV = Low Productivity Potential/Low Agricultural Land Potential
NA = Nonapplicable; NR = No response

The evaluation of HO$_1$ and the four subhypotheses was based on the calculated frequencies and percentages displayed in Table 1. A majority of the Program Officers agreed with Crosson only that Argentina and Brazil fit the characteristic of category II (High Productivity Potential/High Agricultural Land Potential).

Fewer than 50% of the respondents agreed with Crosson regarding the placement of Australia, Canada and the United States in category I (Low Productivity Potential/High Agricultural Land Potential); with placing the Sudan in category II (High Productivity Potential/High Agricultural Land Potential); with China, India, and Indonesia in category III (High Agricultural Productivity/Low Agricultural Land Potential); and with France, Hungary, and West Germany in category IV (Low Productivity Potential/Low Agricultural Land Potential).

Based on the criterion of 50% agreement of respondents with Crosson's model, all four sub hypotheses were rejected. Therefore, hypothesis HO$_1$ also was rejected. The majority of respondents did not share the same opinions as Crosson with regard to his classification system.

Objective 3

The third objective of the study was to determine if relationships existed between Program Officer's placement of selected countries (Argentina, Brazil, Sudan, China, India, and Indonesia) in categories II and III and (a) their most recent types of international field experiences, and (b) levels at which respondents had worked during their most recent field experience. These countries were of interest to the researchers since they were classified as less developed countries in comparison with the other six countries used in the Crosson's theory. In addition to this, these countries in categories II and III were those that Crosson considered with High Productivity Potential, or still in the process of developing their agricultural sectors. Countries in his categories I and IV had lower potential for further productivity.

Frequency tables and Cramer's contingency coefficients (Cramer's *V*) were calculated to evaluate each of the following twelve hypotheses:

HO$_{3.1}$ Program Officers' types of field experiences are not related to their placement of Argentina in category II.

HO$_{3.2}$ Program Officers' types of field experiences are not related to their placement of Brazil in category II.

HO$_{3.3}$ Program Officers' types of field experiences are not related to their placement of Sudan in category II.

HO$_{3.4}$ Program Officers' types of field experiences are not related to their placement of China in category III.

HO$_{3.5}$ Program Officers' types of field experiences are not related to their placement of India in category III.

HO$_{3.6}$ Program Officers' types of field experiences are not related to their placement of Indonesia in category III.

HO$_{3.7}$ Program Officers' level of work during their most recent field experience is not related to their placement of Argentina in category II.

HO$_{3.8}$ Program Officers' level of work during their most recent field experience is not related to their placement of Brazil in category II.

HO$_{3.9}$ Program Officers' level of work during their most recent field experience is not related to their placement of Sudan in category II.

HO$_{3.10}$ Program Officers' level of work during their most recent field experience is not related to their placement of China in category III.

HO$_{3.11}$ Program Officers' level of work during their most recent field experience is not related to their placement of India in category III.

$HO_{3.12}$ Program Officers' level of work during their most recent field experience is not related to their placement of Indonesia in category III.

The practical interpretation of the Cramer's contingency coefficients was based on the set of descripters by Hinkle, Wiersma, and Jurs (1979): 0.00 to 0.30--little if any correlation; 0.30 to 0.50--low correlation; 0.50 to 0.70--moderate correlation; 0.70 to 0.90--high correlation; and 0.90 to 1.00--very high correlation. The association between the variables, placement of selected countries in categories II and III and (a) their most recent types of international experiences, and (b) levels at which respondents had worked during their most recent field experience were analyzed. These associations were interpreted using the set of descripters proposed by Hinkle, Wiersma and Jurs (1979). Only those associations presented in tables that had correlations of .30 or above are discussed in this paper.

Based on a calculated V of 0.31 it was established that there was a low association between the variable for Brazil (Refer to Table 2).

Table 2. **The Relationship Between Most Recent types of Field Experiences and Program Officer's of Brazil in Category II** (N = 62)

	Program officer's placement of Brazil in category II		
Most recent types of field experiences	No n %	Yes n %	Total n %
Consultancy and assessment	11 36.7[a]	19 63.3	30 100.0
Administrative/Management	5 35.7	9 64.3	14 100.0
Agricultural Extension	0 0.0	1 100.0	1 100.0
Teaching in a formal educational setting	7 77.8	2 22.2	9 100.0
Research	4 50.0	4 50.0	8 100.0

Note. Cramer's V = 0.31

[a] row percentage.

The nature of the association was such that the majority of respondents who were engaged in either consultancy and assessment or administration/management agreed with Crosson's placement of Brazil while the majority of respondents whose most recent field experience involved teaching in a formal educational setting did not agree with Crosson's placement.

Based on the magnitude of the Cramer's V (0.37) it was determined that there was a low association between the variables for Sudan (see Table 3). Table 3 shows that a majority of respondents engaged in field experiences that involved consultancy and assessment, research, or teaching in a formal educational setting did not agree with Crosson's placement of Sudan in category II. However, 50% of the respondents engaged in administrative/management field experiences did agree with Crosson's placement of Sudan in category II.

Table 3. **The Relationship Between Most Recent types of Field Experiences and Program Officer's placement of Brazil in category II** (N = 62)

Most recent types of field experiences	**Program officer's placement of Sudan in category II**		
	No	**Yes**	**Total**
	n %	n %	n %
Consultancy and assessment	18 60.0[a]	12 40.0	30 100.0
Administrative/Management	7 50.0	7 50.0	14 100.0
Agricultural Extension	0 0.0	1 100.0	1 100.0
Teaching in a formal educational setting	9 100.0	0 0.0	9 100.0
Research	6 75.0	2 25.0	8 100.0

Note. Cramer's V = 0.37

[a] row percentage.

Based on a calculated V = 0.44 it was established that there was a low association between the variables in the case of India (Table 4).

Table 4. **The Relationship Between Most Recent types of Field Experiences and Program Officer's Placement of India in Category III** (N = 62)

Most recent types of field experiences	**Program officer's placement of India in category III**		
	No	**Yes**	**Total**
	n %	n %	n %
Consultancy and assessment	26 86.7[a]	4 13.3	30 100.0
Administrative/Management	6 42.8	8 57.2	14 100.0
Agricultural Extension	0 0.0	1 100.0	1 100.0
Teaching in a formal educational setting	7 77.8	2 22.3	9 100.0
Research	6 75.0	2 25.0	8 100.0

Note. Cramer's V = 0.44

[a] row percentage.

Most of the participants engaged in consultancy and assessment did not place India in the same category as Crosson (see Table 4). Also, a majority of the respondents engaged in teaching in a formal educational setting and research, did not agree with Crosson's placement of India in category III. However, more than half of the respondents engaged in administration/management field assignments and the one respondent in agricultural extension did agree with Crosson's placement of India in category III.

Based on a calculated Cramer's V = 0.34 it was established that there was a low association between the variables for Indonesia (Table 5).

Table 5. **The Relationship Between Most Recent types of Field Experiences and Program Officer's Placement of Indonesia in Category III** (N = 62)

	Program officer's placement of Indonesia in category III		
	No	**Yes**	**Total**
Most recent types of field experiences	n %	n %	n %
Consultancy and assessment	24 80.0[a]	6 20.0	30 100.0
Administrative/Management	10 71.4	4 28.6	14 100.0
Agricultural Extension	0 0.0	1 100.0	1 100.0
Teaching in a formal educational setting	9 100.0	0 0.0	9 100.0
Research	7 87.5	1 12.5	8 100.0

Note. Cramer's V = 0.34

[a] row percentage.

Twenty percent or more of the respondents engaged in consultancy and assessment, administration/management and extension agreed with Crosson's placement of Indonesia in category III.

The results of the test conducted for HO3.11 revealed that there was a low association (V = 0.31) between the variables, level of work during respondent's most recent experience and Program Officer's placement of India in category III (refer to table 6). The nature of the association indicated 40% or more of the respondents who had worked at the district or farm level placed india in Crosson's category III. Thirty percent or fewer from the other groups agreed with Crosson.

Table 6. The Relationship Between Level of Work During Program Officer's Most Recent Types of Field Experiences and Their Placement of India in Category III (N = 62)

	Program officer's placement of India in category III		
	No	Yes	Total
Most recent types of work levels	n %	n %	n %
National	21 77.8[a]	6 22.8	27 100.0
University	11 91.7	1 8.3	12 100.0
International	9 69.2	4 30.8	13 100.0
District	3 60.0	2 40.0	5 100.0
Farm or village	4 57.1	3 42.9	7 100.0

Note. Cramer's $V = 0.31$
[a] row percentage.

EDUCATIONAL IMPORTANCE

Knowledge of perceptions of agricultural systems by program officers of BIFAD that emphasize the interaction among resources, technologies and the environment, and on their consequences for long-term agricultural development will assist persons who plan international programs. As they develop projects for Third World governments they can use these opportunities to emphasize sustainability in allocation of resources. Additionally, information from this study suggests reevaluation and/or improvement of Crosson's development model.

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Educational Needs of International Graduate Students as Perceived by Graduate Faculty

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Introduction

Nearly one-third of all students worldwide who study abroad enroll at U.S. institutions. The Institute of International Education (IIE) reports that in 1991-92 the total foreign enrollment at U.S. college and universities reached an all-time high of 419,585. This figure reflects a 3% increase over the 1990-91 academic year and a continuance of the trend of increased enrollment in the decades following the end of World War II (Greisberger, 1992; Timko, et.al., 1991). Another trend is the increase of students coming to the U.S. to pursue graduate degrees. According to IIE the 1990-1991 report the number of foreign graduate students was 182,130 representing a 7% increase over 1989/90 figures (1990/91 Open Doors, p. 33).

Several studies have been conducted that examine both international student and faculty perceptions of the needs and problems of international students in academic programs (Hull 1978, Lee, 1981, Mtebe, 1985, Omar 1985, and Meioni, 1986). Some of the sources of difficulty for foreign students include financial problems, language difficulties, problems in taking exams, and lack of a framework and direction in their academic program (Hull, 1978). According to Lee (1981), the highest rated needs were: obtaining the degree, acquiring special skills and knowledge in their field, having sufficient funds for basic expenses, and obtaining practical work experience before returning home. Foreign students considered their academic adviser to be the key person during their educational program to assist them in meeting these needs. Mtebe (1985) found that foreign students found it problematic to gain working experience related to their field of study before returning home. Omar (1985) discovered that faculty perceptions of student needs differed from the ones identified by the students. Major problem areas as perceived by faculty included use of the English language, social and personal difficulties, and financial difficulties while students indicated finances, use of the English language and academic difficulties (in that order). Finally, Meioni (1986) found that homesickness seems to rank as the most serious personal problem followed by finances, housing, and food. Academic difficulties include English language proficiency, understanding lectures, participating in class discussions, and preparing for written and oral reports.

Other studies have focused on faculty perceptions of international student needs (Greisberger, 1985; Khabiri, 1985; and Miri-Shaibani, 1986). Greisberger's study (1985) found that academic advisers needed more information regarding their advisees and further training related to the advising of international students. Communicating with foreign students was perceived to be the greatest problem by advisers surveyed by Khabiri (1985) while finances, use of the English language, and understanding immigration policies were mentioned as the most important problem areas in a study done by Miri-Shaibani (1986). All of these studies point to the importance of the advising process and relationship as it relates to foreign student success.

In addition to the studies noted, several working groups have explored how academic programs can help foreign students succeed. They have found that a major obstacle in the successful academic advising process is that advisers often have very narrow areas of concentration that often conflicts with a broader, multidisciplinary approach that best prepares foreign students to return home (NAFSA Winrock Study, 1990).

The Ohio State University ranks sixth nationally among four year institutions in foreign student enrollment. Autumn Quarter 1992 data reveal that 3,354 students from over 100 countries were enrolled. Of these, over 75% of these students were graduate students (1991/92 Open Doors). In 1992, 276 foreign graduate students were enrolled in the College of Agriculture and 171 students were enrolled in the College of Education. Although foreign graduate student enrollment overall has increased, there has been no corresponding increase in research in regards to the educational needs of these students. This study is an attempt to begin to examine these needs from the perspective of graduate faculty members in the Colleges of Education and Agriculture.

Purpose of Study

The purpose of this study was to assess the importance of selected educational needs of foreign graduate students as perceived by faculty members in the College of Agriculture and Education at The Ohio State University. The study was intended to replicate the study conducted in 1989 by Joseph J. Timko, Richard E. Linhardt, and Bob R. Stewart at the University of Missouri-Columbia. The investigaion focused on differences in perceptions regarding the subsets of curricular, research, and academic advisement needs of international graduate students between the Colleges involved. The study also analyzed differences in perceptions in these same areas according to gender and gathered qualitative data that will be discussed.

The research objectives of the study were to:

* access the importance and satisfaction of selected educational needs of foreign graduate students as perceived by graduate faculty in the Colleges of Education and Agriculture.

* analyze if differences existed in perceptions held by faculty in the College of Agriculture and Education regarding the importance of selected curricular, academic, and research needs of foreign graduate students.

* analyze if differences existed in perceptions held by male and female faculty in both Colleges regarding the importance of selected curricular, academic, and research needs of foreign graduate students.

* identify areas in the foreign student advising process that need improvement on the Ohio State campus.

* gather information regarding foreign student needs as related to curriculum, research, academic advising, or professional preparation which deserve further attention at Ohio State.

Methods

This study used an ex post facto design. The independent variables were college type and gender. The dependent variables were measures of the respondents' perceptions of the three subsets of items on the questionnaire. The population for this study consisted of 317 faculty members in the College of Agriculture and the College of Education. Of the 317 faculty members, 186 were from the College of Agriculture and 131 from the College of Education.

The survey instrument developed for this study is similar to the one used in the Timko, et. al. study with some changes and additions as a result of further review of the literature. The instrument consisted of 30 items in comparison to 23 for the Timko study. Both quantitative and qualitative results were ascertained from the instrument. The questionnaire was not pilot tested since this was a replication study. Cronbach's alpha was used to estimate internal consistency with alpha for importance items equal to .88 and .92 for satisfaction items.

The questionnaire had three sections. The first section asked respondents to use Likert-type scaled to indicate their perceptions of the levels of importance and satisfaction regarding 30 curricular, research and academic advising needs that foreign graduate students may experience while enrolled at The Ohio State University. The subset academic advisement included 10 items, the subset research included 11 items, and the subset curriculum included 9 items. Section two provided faculty members the opportunity to identify other needs of foreign graduate students. The recorded needs were summarized according to predominant themes. The last section asked faculty members to provide demographic information related to their involvement with international graduate students and international experiences.

A cover letter, instrument, and return, self-addressed envelope were mailed to all 317 faculty members on May 27, 1992. A follow-up letter, duplicate instrument, and return envelope were mailed to non-respondents immediately following the initial response deadline of June 10, 1992. The accepting data sample was 62.4% (198/317) while the final useable data sample was 61.4%. In Agriculture, 122 of a possible 186 graduate faculty members provided useable responses (65% response rate). In Education, 67 of a possible 131 faculty responded (51% response rate). Non-response error was controlled through comparing early respondents to late respondents (Miller and Smith, 1983). An analysis of differences between early respondents and late respondents revealed no significant differences in perceptions on either the importance or satisfaction of needs (See Table 1).

Analysis of Data

Means and standard deviations were calculated for each item and each subset of items on the instrument. Univariate analysis of variance (ANOVA) procedures were used to test for significance at the .05 alpha level. No significant differences were revealed between the College means of the perceived importance of subsets of needs when considered simultaneously as illustrated in Table 2.

The following variables were also correlated: (means of Importance 1-30), (means of Satisfaction 1-30), YEARS (number of years respondents had served as academic advisers), ADVISING (number of masters students plus Ph.D. students advised), and INTLEXP (number of months spent in a country other than U.S. as a consultant, study leave, or as a lecturer) (Table 3). Qualitative data were coded and than analyzed according to similar themes.

Results

As illustrated in Table 4, the subset of "research needs" was rated as being most important in Agriculture and the subset of "curricular needs" was rated as most important in Education. The academic advisement item, "Understand the university academic system as related to obtaining a degree" was given the highest importance rating in Agriculture, while the item, "Be informed of the role student should expect academic adviser to play during program" was given the highest importance rating in Education. The item, "Become familiar with research journals in professional area" was given the highest importance rating by both Agriculture and Education in the research subset. Under the subset curriculum, the items "Achieve competency in writing English" and "Achieve competency in speaking English" were given the highest importance rankings by both Agriculture and Education.

The subset of curricular needs was perceived as being least satisfied in Agriculture while the subset of academic advisement needs was perceived as least satisfied by Education. The academic advisement item, "Be advised by an academic adviser who has worked in students home country" was given the lowest satisfaction rating in Agriculture. Education ranked three items as providing the lowest satisfaction including: "Be advised by academic adviser of same gender"; "Advised by academic adviser who is familiar with stages of cross-cultural adjustment"; and "Advised by academic adviser who has worked in student's home country." Under the subset research, the item, "Identify/establish contacts with international donor agencies" was given the lowest satisfaction ranking in both colleges. In the category, curriculum, the item, "Complete internship related to academic area" was given the lowest satisfaction ranking by Agriculture while Education ranked the item, "International dimension presented in courses" as lowest.

As illustrated in Table 5, the subset of research needs was perceived as being most important by both men and women. The academic advisement item, "Understand the university academic system as related to obtaining a degree" was also perceived as most important both male and female respondents. The item, "Become familiar with research journals in the area" was ranked as most important by both respondents in the research subset. Under the subset curriculum, the item "Achieve competency in writing English was given the highest importance ranking again by both male and female respondents.

The subset of academic advisement needs was perceived as being least satisfied by the female respondents while the subset, curriculum needs was perceived as least satisfied by the male respondents. The academic advisement item, "Be advised by adviser who has worked in the student's home country" was given the lowest satisfaction rating by both male and female respondents. Under the subset, research, the item "Establish contacts with international donor agencies" was given the lowest satisfaction ranking by both respondents. In the category, curriculum, male respondents gave the item, "Complete an internship related to academic area" the lowest satisfaction rating while female respondents gave the lowest rating to the item, "International dimension presented in courses."

As seen in Table 3, correlational tests found no significant relationships between the number of years a respondent served as an adviser and the other variables. The only positive correlation found was between the variable International experience and number of years advising but this result was considered insignificant since it was the result of only two cases.

Five major themes were identified as a result of qualitative information collected: four as related to foreign student needs and one pertaining to the instrument. These themes included:

> *Foreign student needs are similar to those of domestic students and often these needs are equally unmet. Issues that differentiate foreign from domestic students are communication problems and the amount of guidance required.
>
> *"Foreign students" are not a homogenous group and thus, it is difficult or impossible to ascertain their needs because they vary.
>
> *Foreign students social needs are as important to examine as academic needs.
>
> *Foreign students compete with domestic students for attention and money providing less incentive for academic advisers to advise them. There are more benefits in advising domestic students.
>
> *The instrument's validity was questioned particularly in regard to the satisfaction questions. Respondents wondered how they could respond as to what are foreign student needs, particularly how or if these needs are satisfied. Other respondents indicated that the instrument results might be useful in determining ways to address "perceived" unmet foreign student needs.

Conclusions

Similar to Timko et.al., this study found that The Ohio State University College of Agriculture and Education graduate faculty members believe that the educational needs of foreign graduate students are often not being met. The fact that foreign students are lumped into one group as in this study may be one reason individual students' needs go unmet. More attention should be given to ascertaining foreign student needs as differentiated by culture, geographic region, gender, area of study, subject level and so on (NAFSA 1990). When faculty members are differentiated by gender, our study found that both men and women advisers indicated that research needs are most important. They did differ though on their perceptions of what needs are least satisfied with women advisers believing that academic advisement needs are least satisfied and men believing curriculum needs are least satisfied.

The findings emphasize the importance of all three subset areas (academic advisement, curriculum and research) and the strong relationship between the three areas. Although many respondents placed a great deal of emphasis on research needs equal attention must be paid to curriculum needs. Faculty in the College of Education indicated that curricular needs were most important and faculty in Agriculture felt that curricular needs were being least satisfied.

Perhaps a topic that ties all three subset areas together best is "relevancy" of the education received. Findings of this study indicate that academic advisers place less importance on a graduate program being relevant to the students background. These findings are contrary to what foreign students indicate as being important as far as their academic program (Rohls 1992, Mashburn 1984). Rohl's study (1992) found that program relevance, including the relevancy of the student's thesis or research topic continues to be an area of dissatisfaction for many foreign students (p. 75). The academic adviser in many cases is the single most important person in assisting students to reach academic goals that are relevant to them and their society (Mashburn 1984). It appears that academic advisers must place more emphasis on being culturally sensitive and knowledgeable of the individual's background. As seen by our study, these qualities are not always acquired just through overseas international experiences. On the contrary, they may be acquired through doing readings, engaging in discussions with foreign students and colleagues on campus, attending workshops, and so on. This may be an important area for further research particularly as related to faculty perceptions as universities encounter budget constraints and diminishing resources. These type of scenarios may provide less incentives for advisers to consider advising foreign students and to obtain further training.

Similar to the Timko et.al., study, academic advisers in our study were concerned with students' level of English proficiency and the impact these skills have on academic performance.
As indicated by other studies (Lee 1981, Mtebe 1985), foreign students themselves are also quite concerned with language issues. Advisers can play a key role in addressing this issue on an individual level. It is important though that advisers differentiate between "accent" and competency and that they access what specific areas of language skills students need assistance in such as writing, speaking, comprehension, reading. University administrators play an important role in providing the proper resources so that language does not become a deterrent to learning (Jenkins, 1983).

Educational importance

Foreign graduate students will continue to attend universities and colleges in the United States. As such, issues of relevance and appropriateness of a U.S. graduate education for such students will remain a key concern. Faculty advisers can play a key role in addressing these issues and, we believe, in making a difference in foreign students' educational experience. As seen in the Timko study and in this study, differences of perceptions regarding international student needs exist among academic areas. Recognition of these differences is crucial in developing graduate student policies and training of advisers. Faculty advisers will not be able to play this important role on their own though. They will need assistance and support from university administration and from international education offices on their own campuses. University administrations must make English language assistance a priority if they are to continue to admit international students and should commit sufficient resources to allow better preparation of both international students and faculty advisers in the graduate advising process. This is not impossible with the assistance of existing resources already on many campuses such as English as Second Language offices and International student/education offices.

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TABLE 1

Comparison of early to late respondents by domain

Domain	M	SD	df	t
Importance - E	5.3	.57		
Importance - L	5.1	.71	166	1.5
Satisfaction - E	4.7	.66		
Satisfaction - L	4.7	.90	148	1.5

TABLE 2

ANOVA for the importance and satisfaction domains by college

SOURCE		M	SD	df	SS	MS	F
Academic Advisement							
Importance:	Overall	5.1	.7				
	Agriculture	4.9					
	Education	5.2					
Variance:	Between Colleges			1	.4	.4	.281
	Within Colleges			18	25.6	1.42	
	Total			19	26.0		
Satisfaction:	Overall	4.7	.8				
	Agriculture	4.7					
	Education	4.5					
Variance:	Between Colleges			1	.1	.1	.5
	Within Colleges			18	3.9	.2	
	Total			19	4.0		
Research							
Importance:	Overall	5.5	.7				
	Agriculture	5.5					
	Education	5.6					
Variance:	Between Colleges			1	-.02	-0.2	-0.01
	Within Colleges			20	318	15.9	
	Total			21	317.8		
Satisfaction:	Overall	4.6	.8				
	Agriculture	4.5					
	Education	4.6					
Variance:	Between Colleges			1	.1	.1	.3
	Within Colleges			20	6.7	.3	
	Total			21	6.8		
Curriculum							
Importance:	Overall	5.3	.8				
	Agriculture	5.2					
	Education	5.5					
Variance:	Between Colleges			1	.9	.9	2.20
	Within Colleges			16	6.6	.41	
	Total			17	7.5		
Satisfaction:	Overall	4.5	.8				
	Agriculture	4.5					
	Education	4.6					
Variance:	Between Colleges			1	.1	.1	.5
	Within Colleges			16	2.5	.2	
	Total			17	2.6		
	Agriculture						
	Education						

*Alpha = .05

TABLE 3

Correlation Matrix

	M_I	M_s	Years	Advising	International Experience
M_I	1.0				
M_s	-.06	1.0			
Years	.03	-.04	1.0		
Advising	.07	-.06	.02	1.0	
International Experience	*	*	**1.00	*	1.0

*only 1 case
**only 2 cases
M_I = Means of I1 to I30 (variables I1 to I30)
M^s = Means of S1 to S30 (variables S1 to S30)
Years = years as adviser
Advising = M.S. and Ph.D. advising
International Experience = Consultant or study leave or lecturer

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TABLE 4

Means of respondent perceptions of the items related to educational needs of international graduate students differentiated by college

ITEM	M Importance Agri	M Educ	M Satisfaction Agri	M Educ
Academic Advisement				
1.Advised by acad.adv.who has worked/studied out of U.S.	6.26	6.43	4.66	4.08
2.Share responsibility w/acad adv in planning program.	6.08	6.09	5.28	5.32
3.Clarify acad & prof goals w/ acad. adv.	6.09	6.21	5.08	5.12
4.Maintain prof.contact w/ acad. adv. after graduating.	4.96	4.64	4.39	4.30
5.Advised by adv.w/previous exp working w/ intl. stds.	4.64	5.01	4.83	4.49
6.Advised by adv. of same gender.	2.51	2.36	4.63	4.00
7.Advised by adv. who has worked in student's home country.	3.47	3.73	4.29	4.00
8.Understand univ.academic system as related to obtaining degree.	6.21	6.46	4.84	5.00
9.Informed of role std should expect adv. to play during program.	6.01	6.48	5.00	5.00
10.Adv. is familiar w/ stages of cross-cultural adjustment.	5.24	5.81	4.32	4.00
	—	—	—	—
SUBSET M =	4.95	5.22	4.73	4.85

ITEM	M Importance Agri	M Educ	M Satisfaction Agri	M Educ
Research				
11.Advice on preparation of research proposal.	6.16	6.52	4.78	5.00
12.Advice on how to apply for research grant.	5.18	5.01	4.14	4.28
13.Collect data in home country.	3.92	4.15	4.23	4.45
14.Conduct research based on research/technology available in home.	4.43	4.28	4.08	4.40
15.Become familiar w/ research journals in area.	6.60	6.70	5.59	5.52
16.Write article for journal.	6.19	5.67	5.02	4.49
17.Present research to faculty and graduate students.	6.47	5.70	5.60	4.88
18.Learn computer process for research purposes.	6.31	6.37	5.67	5.72
19.Attend regional or national conferences.	6.01	5.88	5.11	4.60
28.Conduct research on home country problem.	4.38	4.99	4.45	4.36
30.Establish contacts w/ intl. donor agencies.	4.74	4.91	3.96	3.67
	—	—	—	—
SUBSET M =	5.59	5.63	4.69	4.64

ITEM	M Importance Agri	M Educ	M Satisfaction Agri	M Educ
Curriculum				
20.Collaborate w/ fac/stds on non-degree project.	4.67	5.20	4.24	4.32
21.Work w/ grad. stds. on regular basis.	5.23	5.57	4.51	4.60
22.Intl. dimension presented in courses.	4.99	5.31	4.44	4.19
23.Complete internship related to academic area.	3.84	5.08	3.89	4.34
24.Achieve competency in speaking English.	6.37	6.33	4.79	4.80
25.Go on course related field trips.	4.97	5.27	4.21	4.45
26.Use word processing to complete assignments.	5.46	5.88	5.27	5.49
27.Achieve competency in writing English.	6.39	6.49	4.60	4.98
29 Gain teaching experience.	4.08	5.34	4.46	4.61
	—	—	—	—
SUBSET M =	5.28	5.54	4.46	4.61

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TABLE 5

Means of respondent perceptions of the items related to educational needs of international graduate students differentiated by

ITEM	M Importance Male	M Female	M Satisfaction Male	M Female
Academic Advisement				
1.Advised by acad.adv.who has worked/studied out of U.S.	6.31	6.39	4.34	4.04
2.Share responsibility w/acad adv in planning program.	6.08	6.19	5.37	5.33
3.Clarify acad & prof goals w/ acad. adv.	6.08	6.39	5.12	4.93
4.Maintain prof.contact w/ acad. adv. after graduating.	4.83	4.81	4.35	4.40
5.Advised by adv.w/previous exp working w/ intl. stds.	4.79	4.70	4.77	4.48
6.Advised by adv. of same gender.	2.64	3.73	4.65	4.11
7.Advised by adv. who has worked in student's home country.	3.48	3.90	4.15	3.48
8.Understand univ.academic system as related to obtaining degree.	6.22	6.68	4.93	5.03
9.Informed of role std should expect adv. to play during program.	6.12	6.48	4.92	4.63
10.Adv. is familiar w/ stages of cross-cultural adjustment.	5.34	6.00	4.30	3.63
	—	—	—	—
SUBSET M =	4.99	5.33	4.71	4.48

ITEM	Importance Male	Female	Satisfaction Male	Female
Research				
11.Advice on preparation of research proposal.	6.22	6.68	4.87	5.00
12.Advice on how to apply for research grant.	5.11	5.19	4.20	4.11
13.Collect data in home country.	3.84	4.74	4.51	4.39
14.Conduct research based on research/technology available in home.	4.28	4.90	4.16	4.37
15.Become familiar w/ research journals in area.	6.60	6.74	5.53	5.63
16.Write article for journal.	6.00	6.05	4.93	4.38
17.Present research to faculty and graduate students.	6.27	5.97	5.37	4.79
18.Learn computer process for research purposes.	6.31	6.42	5.69	5.67
19.Attend regional or national conferences.	5.93	5.64	4.99	4.63
28.Conduct research on home country problem.	4.42	5.23	4.51	4.37
30.Establish contacts w/ intl. donor agencies.	4.73	5.07	3.90	3.61
	—	—	—	—
SUBSET M =	5.44	5.69	4.77	4.63

ITEM	M Importance Male	M Female	M Satisfaction Male	M Female
Curriculum				
20.Collaborate w/ fac/stds on non-degree project.	4.82	5.03	4.20	4.61
21.Work w/ grad. stds. on regular basis.	5.31	5.58	4.52	4.71
22.Intl. dimension presented in courses.	4.97	5.81	4.43	3.93
23.Complete internship related to academic area.	4.17	4.86	4.05	4.16
24.Achieve competency in speaking English.	6.36	6.30	4.78	4.87
25.Go on course related field trips.	5.03	5.32	4.32	4.18
26.Use word processing to complete assignments.	5.34	5.97	5.32	5.52
27.Achieve competency in writing English.	6.38	6.64	4.68	5.03
29 Gain teaching experience.	4.87 1	4.70	4.23	4.21
	—	—	—	—
SUBSET M =	5.27	5.58	4.90	4.58

a responses regarding importance and satisfaction were coded: 1 = very unimportant; 2 = quite unimportant; 3 = somewhat u mp
4 = neither important or unimportant; 5 = somewhat important; 6 = quite important; and 7 = very important

Session B INNOVATIVE APPROACHES TO EXTENSION

1. **Mennonite Central Committee in Bangladesh: The Evolution of its Extension Programs Since 1971**
   John H. Murphy

2. **A Simplified Methodology for Training Peasant Farmers How to Conduct Site-specific Scientific Field Trials in Deprived Rural Areas**
   Edward D. Ruddell

3. **Rethinking the Landscape: Catchments, Communities and the "Third World Model" of Extension in Victoria, Australia**
   Ruth Beilin

4. **Personal Networks and Agricultural Extension**
   Richardo C. Armonia

MENNONITE CENTRAL COMMITTEE IN BANGLADESH: THE EVOLUTION OF ITS EXTENSION PROGRAMS SINCE 1971

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INTRODUCTION

Bangladesh lies in the delta of three great rivers. The alluvial soils deposited by these rivers are reportedly among the richest in the world. Sufficient rainfall and warm year-round temperatures allow crops to grow twelve months out of the year. Combine this with an abundance of labor and the result is agricultural conditions which are nearly ideal. Yet agricultural yields in Bangladesh have been among the lowest in the world (Hartmann and Boyce, 1979). Numerous social problems have overwhelmed the agricultural assets keeping this Asian nation among the world's most desperate. Such problems include, among others, an extremely low per capita income, a burgeoning population, a low level of education, landlessness, and inappropriate government policy (Hartmann and Boyce, 1979; Nicholls, 1984).

Because of the great need for so many basic services, Bangladesh has been host to many private, international and governmental organizations offering assistance. One group is Mennonite Central Committee (MCC), a service and development organization of the North American Mennonite and Brethren in Christ churches.

The initial effort by MCC in Bangladesh in 1971 was relief and rehabilitation. This was in response to a devastating cyclone, followed by the civil war which led to the independence of Bangladesh (E. Martin personal communication, Oct. 26, 1993). Soon following that, MCC moved toward developing more long-term agricultural research and extension programs (Figure 1).

Originally the focus of those programs was simply crop-based community development. MCC soon realized, though, that the causes of poverty among the rural people in Bangladesh were far more complex. More recently programs have matured into rural development efforts that seek to address the broader socio-economic conditions of specifically targeted groups--subsistence/below-subsistence farmers and women (Buckland and Graham, 1990). In addition, while the program has remained in the southern, coastal Noakhali District, it has shifted from an extensive effort throughout the region, to an intensive one concentrating on a more defined localized area (Nafziger, 1992).

PURPOSE OF THE PAPER

The intent of this paper is to review the agricultural extension programs of Mennonite Central Committee in Bangladesh during the past twenty years, and to chart its evolution in its ongoing attempt to be more effective in addressing the issues of poverty among rural people.

METHODS AND DATA SOURCES

Information was gathered largely from MCC documents such as agricultural reports and program reviews, many of which have never been published. Other information was obtained through personal communication with people who have worked with MCC programs in Bangladesh.

RESULTS

Winter Crop Program

Following its early relief work in Bangladesh, MCC launched its first agricultural effort in 1972 with the Winter Crop Program (WCP). In pursuing the goal of helping Bangladesh attain nutritional self-sufficiency, the primary focus of WCP was the establishment and promotion of new crops for the dry season. These were primarily vegetable crops and were viewed to be an important addition to what was perceived as an overemphasis of rice development occurring at the national level. Research on the suitability of these crops were carried out, but the adaptation and extension of the new technology in the Noakhali area was the primary initiative. The importance was placed on fielding knowledgeable extension workers who could bridge the gap between the researcher and the farmer (Buckland & Graham, 1990).

In the mid-late 1970s, the agriculture program diversified to include distinct research and extension programs. The crop research component became more specialized and several research stations were opened. In the extension program, extension workers were hired and placed throughout the Noakhali District where they promoted new technology through demonstration plots and visits with individual farmers. The extension process later became more systematic with the adoption of a contact farmer approach. The contact farmers became a second tier of extensionists working in their own areas and thus enabling a broadening of the work area (Buckland & Graham, 1990). In addition, an appropriate technology program was begun to address irrigation concerns, as well as a project to offer credit to farmers. Also begun at that time, although informally, was the promotion of kitchen gardens and nutrition education to women (Buckland & Graham, 1990).

Restructuring MCC's Agriculture Program

In the early 1980s, the first real restructuring of MCC's agriculture program occurred with the realization that the extension and research components needed to be better integrated, and that better attention to the whole agro-socio-economic situation of the Noakhali farmer was needed. This led to the implementation of the Cropping Systems Research program (CSR) which later evolved into the Farming Systems Research program (FSR) (M. Nord, personal communication, November 17, 1993). Both CSR and FSR expanded the scope of new technology to ultimately include not only vegetables, but field crops, fruit trees, poultry, livestock and fisheries as well. New technology was first tested on the experiment stations and then later adapted through on-farm trials with the cooperation of extension workers (MCC Agriculture Program, 1992).

During this same time, MCC became concerned that the WCP and other programs were benefiting medium-sized farmers and not the most needy (Buckland & Graham, 1990). The result was a shift in emphasis of the extension program to directly target subsistence farmers--those farmers who could provide 3-8 months per year of self sufficiency from their farm resources--and women. This led to the implementation of several new programs.

Rural Savings Program

The Rural Savings Program (RSP), begun in 1981, was designed to assist rural landless people with a system of savings and investment. MCC became dissatisfied with the earlier effort in credit extension and terminated it, mainly because the prime beneficiaries tended to be medium and large farmers (Buckland & Graham, 1990). In contrast to that program, the centerpiece of the RSP effort was the social organization of the rural people. This approach was recognized by MCC as a more valuable tool for the empowerment of the resource-poor than sole reliance on technology transfer (M. Nord, personal communication, December 6, 1993). The chief goal of the group formation process was to help increase the opportunities of individuals for ultimate socio-economic transformation (MCC Agriculture Program, 1992). Men in groups of 20-25 would pool their resources toward projects which would generate income for them. MCC nurtured these efforts through technical assistance, training to develop functional skills, and low-interest loans (MCC Agriculture Program, 1992).

Homesite Program

The Homesite Program (HSP), also begun in 1981, attempted to address the vulnerability of women in Bangladeshi society by providing basic education to resource-poor women in health, nutrition, agriculture and women's awareness issues. Extension officers worked in a limited number of villages with interested women who qualified for a three-year period. The impact of HSP on families was monitored through the use of a baseline survey which was taken on the health, nutritional and socio-economic status of each family prior to beginning the program (MCC Agriculture Program, 1992).

Soybean Program and Subsistence Farmer Program

In 1983, the extension program split into two separate programs, the Soybean Program and the Subsistence Farmer Program (SFP). Although MCC had been working earlier to introduce soybeans into the Bangladeshi diet as a protein source, the effort was formalized by the initiation of the Soybean Program. The program not only included promoting soybeans as a viable crop option, but the issue of marketing a soybean product in Bangladesh was addressed as well (MCC Agriculture Program, 1992). Because soybean production has a low labor requirement, it tended to be a more suitable crop for medium-sized farmers who largely rely on hired labor. The SFP, on the other hand, was created to specifically target farmers with small land-holdings. Unlike soybeans, vegetables were mostly high labor, high return crops which were ideal for subsistence farmers. Therefore vegetable crops became the cornerstone of the SFP, but information in other areas (i.e., livestock, fisheries and poultry) was also provided. The extension workers attempted to better understand the socio-economic situation of the farmers by collecting and using pertinent data on each household (Buckland & Graham, 1990).

Partners in Agricultural Research and Extension

In 1988, MCC also developed Partners in Agricultural Research and Extension (PARE). This effort sought to combine the agricultural research and extension strengths of MCC with the social organizing skills of compatible Bangladeshi NGOs. This allowed MCC to be involved in multifaceted development in areas outside of the Noakhali district without having to provide the necessary infrastructure (M. Nord, personal communication, Nov. 17, 1993).

Homestead Resource Development Program

Although the Homesite Program and the Rural Savings Program were distinctive in many ways, the extension education needs of both programs were complementary. This allowed the two to be easily integrated, and in 1992 they were combined to become the Homestead Resource Development Program (HRDP) (Nafziger, 1992). The group formation process, which was the strength of the RSP, was retained and emphasized in HRDP. The program was targeted toward men and women who owned a maximum of one-half acre of land and could provide rice to their families for no more than 6 months out of the year (E. Martin, personal communication, Oct. 26, 1993). The ultimate purpose was to improve the socio-economic status and health and nutritional condition of these rural families. This was achieved through regular visits by Homestead Resource Facilitators encouraging the economic activities of the groups. Training was also provided in the areas of health, nutrition and agriculture (Mennonite Central Committee, 1993).

Farm Family Development Program

Another consolidation of programs occurred in 1992, when the Subsistence Farmer Program and the Farming Systems Research program were combined to become the Farm Family Development Program (FFDP). The FFDP concentrated its activities in a southern area of Noakhali District where particularly large numbers of subsistence and below-subsistence farmers reside. This area is particularly vulnerable to floods, cyclones, and problems with salinity and water stress. (MCC Agriculture Program, 1992). The program targeted families who could meet their needs for only 2-8 months out of the year (Mennonite Central Committee, 1993). In FFDP, the research component was downsized and now focused on on-farm trials. The extension effort was strengthened by including not only technical advice on new vegetable raising enterprises, but also analyses of farmers resources and cost accounting for these enterprises (Nafziger, 1992). The methodology was based on individual contact of families, both men and women, by Farm Development Facilitators. Also the bold approach of hiring female communicators was implemented to assist the farm family in health and nutritional concerns (Nafziger, 1992).

SUMMARY

All of these program changes made by MCC occurred after some early successes in the promotion of new crops. However, it quickly became apparent that further success would require a better understanding of the socio-economic problems of the rural people. MCC recognized that the direct causes of poverty in Bangladesh (i.e., lack of income, low food production and overpopulation) were contributed to by other structural causes (i.e., unequal access to productive resources, a social-political system which perpetuates the concentration of power to the few, and a lack of organization by the poor). MCC sought to intervene at this level by restructuring its programs around social organization and increased access to knowledge, skills, credit, and other productive resources (Mennonite Central Committee, 1985). Furthermore the target of these interventions increasingly became those who most needed it; subsistence farmers, the landless and women. Through these means, MCC has sought to improve upon its effectiveness as a development agency in Bangladesh.

EDUCATIONAL IMPORTANCE

By reviewing the efforts of Mennonite Central Committee in Bangladesh since 1971, insight can be gained into the ongoing process of agricultural development. The process includes a better understanding of the problems being addressed, followed by reevaluation and subsequent reorganization of extension education. The intent of the process is to better provide programs which more closely match the community development needs of the intended populations.

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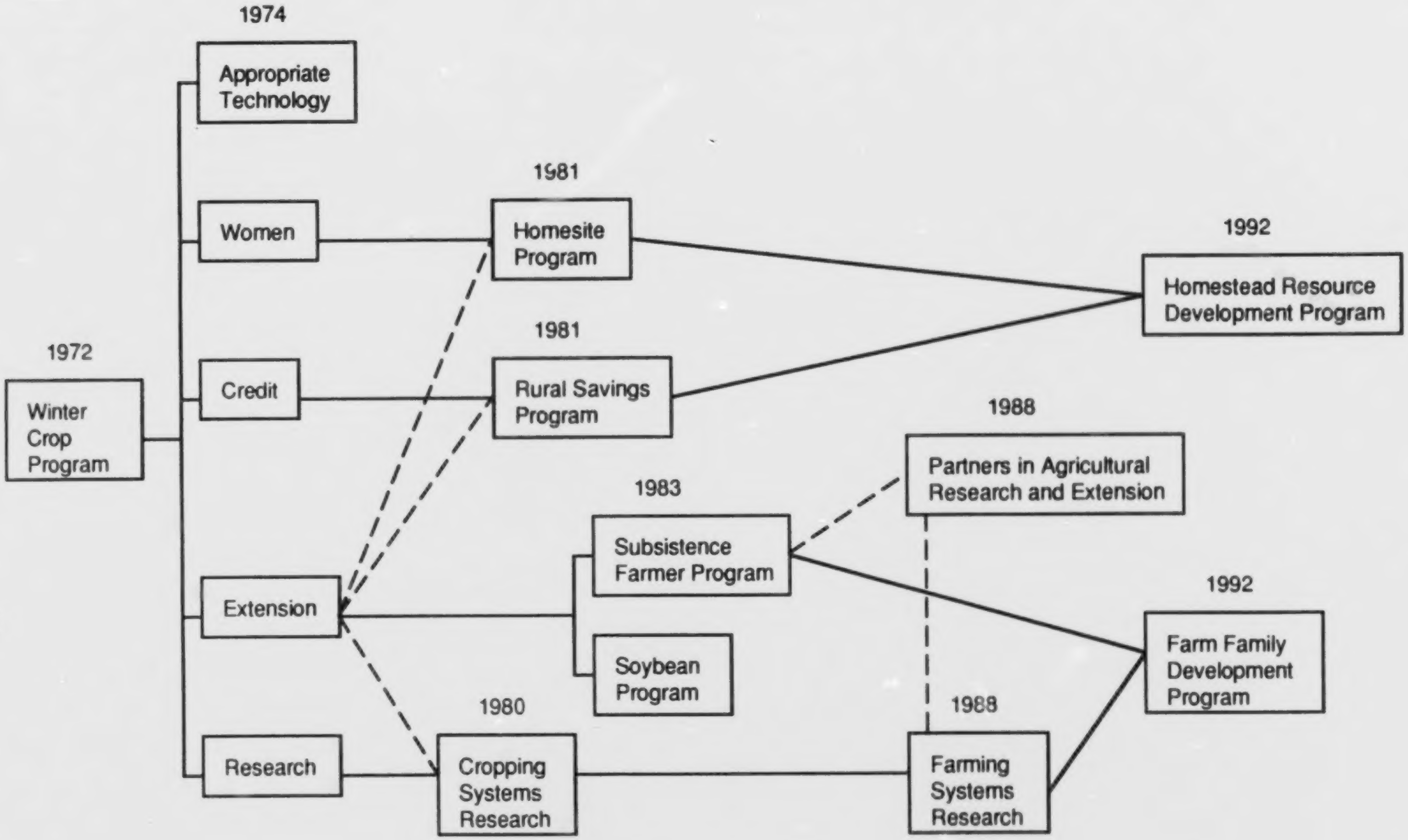
Figure 1. The evolution of Mennonite Central Committee's agricultural extension programs in Bangladesh (adapted from Buckland and Graham, 1990). Solid lines indicate complete incorporation of one program into another, dashed lines represent partial incorporation.


1972
Winter Crop Program
1974
Appropriate Technology
Women
Credit
Extension
Research
1981
Homesite Program
1981
Rural Savings Program
1983
Subsistence Farmer Program
Soybean Program
1980
Cropping Systems Research
1988
Partners in Agricultural Research and Extension
1988
Farming Systems Research
1992
Homestead Resource Development Program
1992
Farm Family Development Program

A Simplified Methodology For Training Peasant Farmers How To Conduct Site-Specific Scientific Field Trials In Deprived Rural Areas

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Introduction: Two-thirds of the earth's population (more than three billion people) live in villages of the developing world. The World Bank (1992) estimates that 1.1 billion of these people are forced to live on US$ 1 per day or less. (Brown, 1989 and 1992; World Bank 1992; and UNDP, 1992). Poverty of this magnitude has been one of the primary causes for the establishment of numerous terrorist organizations representing diverse ethnic groups around the world. Two well known examples in Latin America include the Shinning Path in Peru and the "Emiliano Zapata" Movement in Chiapas, Mexico. In the case of Peru alone, more than 25,000 lives and 22 billion dollars worth of property have been destroyed. (Serrill, 1992).

Unless rapid action is taken to improve: 1) the delivery of agricultural research and extension services to these sectors, and 2) the delivery of high quality modern contraceptive services, the world can expect ever increasing violence in rural areas. We will also experience massive out-migration from rural areas into over-burdened cities and across international borders.

How can low cost agricultural research and extension services be efficiently delivered to families in desperate need? Rural families in these areas frequently have average land holdings of two acres or less, cultivate degraded soils on hillsides at very diverse elevations and struggle with a myriad of microclimates poorly served by the current transportation systems. To further complicate matters, these areas are frequently populated by one or more of the 600 indigenous groups (United Nations Year of Indigenous Peoples-1993). These people often do not speak, read, and or write the national language used by the agricultural extension systems of their nations. No wonder then that billions of dollars have been invested in these countries as gifts or as loans, benefitting only the wealthier 10-20% of the population. (Albertson, et.al. 1993).

The Purpose of this paper is to interest national and international non-governmental (NGO) and governmental agencies in training rural peasants of limited formal educational backgrounds to conduct applied research, adaptive research, and technological transfer to improve food security in marginal areas of the developing world.

Methodology and data sources: World Neighbors (WN), a non-governmental organization (NGO), began collaborating with local leaders to promote the development of deprived rural areas in 1952. To date it has worked in 43 nations in Asia, Africa and Latin America. In 1982 it published a book entitled **Two Ears of Corn**, that summarized the methodology it had found most effective for training rural peasants to improve the food security in deprived rural areas. This book has now been translated into Spanish, French, Arabic, Indonesian, Khmer and Vietnamese. It has been sold in over 40 university bookstores in the USA and by a variety of other national and international development agencies throughout the world.

Efforts to apply this methodology in programs World Neighbors helped develop in Northern Potosi, Bolivia (Latitude S 18 05' and Longitude W 066 26'), generated some positive, but also negative results. After a decade of efforts, farmers harvested potatoes the size of a "thumb nail" (1,200 kg/ha or less) three successive years in a row. This was devastating to a rural population struggling with infant mortality of 185/1000 and an average life span of 36 years (UNICEF, 1989).

Improving production in this area of Bolivia was going to be a major challenge because of:

- acute soil erosion on "colina" sandy loams,
- cultivation on slopes of 5 to 30 degrees,
- elevations ranging from 2,800 m to 3,900 m,
- average annual temperature of 9 degrees C,
- fequent frosts and hail,
- variation in the performance of varieties due to as little as 200 m elevation,
- farmers growing crops in at least two climatic zones to improve food ecurity,
- relatively complex agronomic practices for potato production, and
- illiteracy rates of 85% or more (UNICEF, 1989).

On the positive side, farmers demonstrated remarkable enthusiasm when they attended monthly training courses and field days conducted in Quechua for several successive years. Part of the reason they were willing to walk up to 24 hours round trip, was because this was one more impoverished area of the world that had no government or agricultural extension services.

Peasant enthusiasm for the training was undoubtedly enhanced by World Neighbors policy that local leaders must be trained to conduct their own field trials. This recognition fostered the pride and dignity of the local Quechua and Aymara peoples and facilitated rapid transfer of appropriate technologies in the local Indian languages. So despite crop failures, program outreach grew from 5 to 120 communities in a geographic area of 11,480 square kilometers, with a population of 70,171 people. (UNICEF, 1989)

Given the major challenges faced in improving the production of this area, World Neighbors-Andean Area (WN-AA) staff concluded that visual observation of the results of farmer field trials and verbal reports of seed planted and harvested were inadequate if we hoped to help the peasants improve the food security of the area in a sustainable manner. It must now attempt to teach the peasants the simplest scientific methods used to improve agricultural productivity in Europe and the United States.

In 1989 Julio Beingolea, the former director of the College of Agronomy of the University of Huamanga -Ayacucho Peru joined WN-AA to do precisely this. His qualifications included fluency in Quechua, Spanish and English, having completed a masters degree at a land grant college in the USA, and 15 years of professional experience in the Huamanga University research program.

The strategy we developed for training small farmers to conduct scientific field trials involved the organization of two three day theory/practice seminars. In the first seminar farmers were: 1) helped to analyze why more systematic methods, documentation and analysis was required to address acute problems of poverty, and 2) taught the principles involved in designing a field trial of simple block design that included a minimum of four experimental treatments. This material was mimeographed on six type-written pages that were distributed to each participant. (Beingolea, J., 1991). Farmers then practiced planning scientific field trials in different locations. At the conclusion of the seminar, peasants were told that if they wished, they would be taught in a subsequent 3 day theory/practice seminar, one month before harvest, how to record the data and analyze it statistically. If they wished, the data could be reported to Julio Beingolea so that he could assure the statistical analysis was done correctly. If the coefficient of variation (C.V.) was 30% or less, it would be published by World Neighbors and shared with other interested institutions and scientists.

The first seminar on how to conduct site-specific scientific trials was followed by the normal 2 day monthly seminars and visits to rural communities by farmer extensionists every 15 to 20 days. From the beginning this new training program depended on local farmer initiative every step of the way. Participation was voluntary. Farmers chose the topics of research, designed the experiment, chose the location, planted, cultivated and harvested the field trial. If they preferred not to have the data analyzed by an agronomist and published, that was fine.

Results to date:

A. Technological

One hundred and one Quechua and Aymara farmers have conducted 210 site specific scientific field trials with coefficient of variation (C. V.) of 30% or less during the past 3 years.

The average cost for the initial training in how to conduct **site-specific** scientific field trials and subsequent analysis done by a professional agronomist was US$ 286 per experiment.

A division of a large international agency responsible for reproducing improved potato seed in poor areas of N. Potosi planned to reproduce an improved variety of potato seed developed in Holland. Scientific field trials conducted by local farmers were used to persuade them this was inappropriate and that the yields they had used to make this management decision were incorrect because they had been conducted at lower elevations.

In addition to testing different organic and chemical fertilization practices, farmers also tested a wide range of varieties of different crops produced in the area to enhance their food security. These included the following:

Bolivia

Potato:	Waycha, Qorisonqo, Colombiana, Huancayo, Alpha, Manzana, Yungay, Saniimilla. Native: Runa, Quyu Quyu, Quyllo, Pali Blanca, Poliña, Arquemilla, Cachiqulu, Yanaruna, Runa Blanca, Pale, Illhuaco, Sacanpaya, Sutamari, Alqaimilla, Paceña, Vacahuma, Quillo and Lavancu.
Barley:	IBTA 80, Tamborada, Negra, San Benito, Native: Chilena, Kumpo, Kullku Pasquita.
F.Bean:	Camayo, Francia, Pairumani P1, Pairumani 5 P5 and native.
Quinua:	Rosada de Junin, Cheweca, Puno 6 and native.
Oats:	EFO 1, Negra, Mantaro 15 and Condor.
Wheat:	Mexico, Paicommomosi, Moija, Pairumani 39, Paimestol, Saguayo. Native: Taylo, Chuqu, Macho blanco, Amarillo and Tucto moro.
Corn:	ompuesto 18, Aychasara, Choclero 2, Ancho and Native: Blanco.

F.Peas:	Arvejita verde, Crema, Tambo, Alderman. Native: Blanco, Tantani and Chichillanka.
Ecuador	
Potato:	Esperanza, Gabriela, Ratona, Maria, Ovilla and Tulca.
Barley:	Shiry-89, Terau-78, Duchicela, Franciscana.
F.Peas:	Pallatanga, Alderman, Peruana.

B. Educational Significance

Data collected from these trials has been analyzed statistically to share with other scientists and interested institutions. Peasant farmers who have conducted these field trials on their own land have trained at planting, mid-season and harvest, 2,850 other farmers in their own **indigenous languages.** This has helped farmers to identify and use the most appropriate agricultural technologies in a remote geographic area that has never been served by government agricultural research or extension services. It has also motivated new peasants to conduct scientific trials of their own and resulted in the Bolivian Ministry of Agriculture asking World Neighbors to sign an agreement with the "Instituto Boliviano de Tecnología Agropecuaria" (IBTA) to facilitate joint collaboration and exchange of information.

C. Methodological Implications (or importance)

Numerous lessons were learned:

- Poorer farmers were enabled to conduct their own research because an experiment required as little as 120 square meters of land.
- Recording yields from diminutive replications of the experiment reduced peasants' fear that these trials would lead to an increase in government taxes.
- The methodology insured the inclusion of a control plot, a frequent shortcoming of former peasant research. This control plot guaranteed accurate visual comparison with other practices tested in the experiment.
- Smaller experimental plots reduced the cost and risk of conducting experiments, a key issue for the poorest.
- Harvests from smaller areas made it easier to weigh, record and compare the visual results. This was particularly important for crops like potatoes that produce large volumes of plant material.
- These trials demonstrated that it was better to plow smaller areas with wooden plows three times, rather than plow ever increasing areas in a desperate effort to meet subsistence needs.
- For the first time, program leaders from adjacent geographic areas believed the relevance of the data from neighboring programs. This led to replication of trials in new areas.

- Research conducted by peasants in one province of Ecuador revealed that the recommendations made by government entities were not always correct because they had not factored in the impact of small variations in altitude in the performance of different varieties. Similar mistakes were also noted in Peru.
- Farmers surprised program leaders by asking them to provide two hours of mathematics prior to monthly agricultural classes conducted in the area.
- To World Neighbors' surprise, 75% of the site-specific scientific field trials conducted by peasants had C.V.' of 30% or less.
- The new methodology also advanced the education of program personnel by motivating them to sign up for radio correspondence courses that enabled them to complete their secondary education.
- Farmers who have participated in the program for two years have gained the confidence and ability to design their own field trials. This continues to surprise professionals from the Division of The International Potato Center in Bolivia, the Peace Corps, and high governmental officials.
- A number of these leaders have now purchased their own calculators and begun to do their own statistical analysis, demonstrating once again that high levels of illiteracy generally reflect the failure of formal institutions to meet the needs of rural people, rather than their ability to learn.

D. Replication

- The specificity, scientific quality and applied nature of the research recently proved important in winning a grant from the Bolivian Government and the World Bank. The grant was used to train 794 women and 1,936 men (total 2,730 farmers) how to use this methodology in 120 communities in N. Potosi Bolivia.
- UNICEF has now promised to publish a book containing the results of all the field trials in Bolivia so that it can be shared throughout N. Potosi with all interested local leaders, government authorities, other NGO's and the World Bank.
- A staff member from a large NGO in Holland, NOVIB, has now expressed interest in organizing a national conference on sustainable development to bring together 20 NGO's they support in Bolivia. One of the objectives of this event will be to encourage other NGO's in Bolivia to make optimum use of the information generated from these experiments and encourage them to test this methodology themselves.

The final conclusion of this paper is that current agricultural research and extension systems will never adequately serve the needs of the poorest 1.5 billion rural poor. In an effort to help resolve this problem, four thousand NGOs from the Organization for Economic Cooperation and Development currently disperse almost three billion US dollars' worth of assistance every year (Clark 1991, p. 47). They in-turn work with around 10,000 to 20,000 Southern NGOs who assist up to 100 million people (ibid p.51).

The following diagram summarizes how this methodology could help these groups train peasant farmers to conduct site-specific research and then motivate governments to include this training in their rural primary school curriculums. This would: 1) help improve the development, transfer and use of appropriate technology to improve food security; 2) help reduce high rates of out-migration from rural areas; and 3) help reduce violence in deprived rural areas of the world.

Current Research System	**New addition to Research System**
	New flow of information ← information
Information →	
Formal Research Instit.	**Rural Primary Schools/ Northern/Southern NGOs**
basic technology research	applied adaptive technology research research transfer
not site specif.	Site specific for local soils /m. climate

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Title: Rethinking the Landscape: Catchments, Communities and the 'Third World Model' of Extension in Victoria, Australia

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Rethinking the Landscape: Catchments, Communities and the 'Third World Model' of Extension in Victoria, Australia

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Introduction

This paper examines some of the issues surrounding agricultural conservation practise in the LandCare movement. LandCare appears as a 'new' extension concept within Victoria and Australia, however, extension practitioners who have worked in non-industrial or 'developing' countries, will recognise many of its attributes as familiar. Fundamental to a perception of 'landcare' is the relationship between the society and the landscape. In this paper some of the extension education issues that evolve as a 'landcare movement' develops, offer an opportunity to apply the lessons learned overseas. As well, recognition of our differences suggests ways in which other 'developed' nations might likewise benefit from the Victorian experience.

As the field work is current and on-going this paper is predominantly conceptual and reflective.

In 1986 the Victorian state government began promoting a conservation program for sustainable agricultural practise known as LandCare. LandCare in Victoria appears to have spawned the generic term "landcare", used throughout Australia to represent community and particularly group action around issues of land degradation. Though "landcare" is now a commonly accepted noun used to describe this model of effective community participation in land management groups in Australia (Campbell 1991), its origins in Victoria, were as a consequence of an idea within the Soil Conservation Authority and the coming to power of a Department Minister with experience in community education. Landcare was taken up on a national scale, after a historic position paper between the main non-government conservation agency (Australian Conservation Foundation) and the national farmers' union (National Farmers Federation) in 1989. In 1989 the federal government committed $A360 million for the Decade of Landcare (Hawke, 1989).

LandCare is based on a group model of extension that is oriented to whole farm planning and integrated catchment management. Exponents and critics both suggest that government promotion of LandCare at the same time as radical reductions in staffing and funding in the Department of Conservation and Natural Resources, and within the Department of Agriculture (Weekly Times, 22.04.92; 30.09.93) reflects an attempt to do more with less. LandCare as a policy supports farm owners and managers in effecting change on private property on a voluntary basis. It also implies a radical shift for these individuals, relying as it does on group activities, the loss of one-on-one extension attention, and the implicit belief that communities can be created around water catchments rather than based on the settlement patterns of the past.

LandCare reflects a critical change in the role of the extension agent, disconnecting these individuals from agricultural technology transfer and re-creating them, often with minimal training, as group facilitators. Agricultural extension agents find themselves discussing conservation management techniques and conservation extension agents are re-born as landcare officers interested in farm productivity as well as their other duties.

Purpose

The inspirational potential of the union of agriculture and conservation offers new hope for the tired landscape of Victoria's farmlands. In the past, the conservation department has been primarily concerned with issues relating to public land. In Victoria, 63% of the land is held privately. Individual landholders are responsible for soil conservation and land use on freehold land, with government having the legislative and ethical responsibility to set a standard for adequate conservation of natural resources (Burch, et *al,* 1987).

The nascency of the LandCare/landcare movement parallels the rise in Australian environmentalism. By the late 1980's there was a populist groundswell that had propelled several Green representatives into state parliament. The signing of the agreement between farmers and conservationists might be seen as a proactive rebuttal to the largely urban based environment movement. This powerfully emotive urban lobby had successfully mobilised the Federal government to intervene in land use control, acting against state and private developers' interests on five out of six disputed preservation areas (Taplin & Tighe, 1989) between 1979-1988. The ascendancy of the Australian environmental movement may have created the "romantic preservationism" (ibid) with which land use was called into question by city dwellers looking inward, from the coast across the continent, to their rural compatriots' use of the land.

Government has not been slow to promote their funding support for Landcare as a part of its environmental policy, indicating concern for land degradation associated with agricultural practise. This advocacy is demonstrated in the publicly funded, high profile Decade of Landcare, LandCare Month, the promotion of a landcare $2.00 coin and a Senate review of the Landcare program. However as the central principle of Landcare is voluntary change on the part of landholders, through supportive community education and extension, the positive media profile becomes a powerful tool for politicians.

The growth in support for Landcare has been so rapid, that only the farmers appear to be unsure exactly where it is going. Likewise, eight years after the launch of the official program, extension agents are treading the muddy waters of change, seeking job surety as well as job satisfaction.

It was a senior manager in the conservation department in 1990, who blithely described the Victorian LandCare program as "our third world model of agricultural extension". This description highlighted some of the philosophical dilemmas and practical difficulties extension agents and farmers would face in the development of the sustainable agriculture model that was based on non-exploitative production. Knowingly or not, the conservation manager unlocked a Pandora's box as he linked rural Victoria to the Third World.

Background Data: Third World–First World Extension

Extension services have long been associated with technological change. Progressive farming was associated with the speed with which new, and often worthwhile innovations were taken up. The development of a diffusion-adoption research model parallels technological innovation in U.S. agriculture, since WW2 (Fliegel, 1983). This model of technological transfer has dominated and is still ascendant in agriculture within the western world, including Australia (Lawrence, 1987). Typically bilateral aid follows this predominant model.

In the 'third world' the advocacy of technology transfer through the diffusion-adoption process started to come unstuck as an analysis of social costs of such innovation became clearer. The Green Revolution is a well described example of how the dominant model can disadvantage those it purported to assist, as well as exposing some of the naive assumptions that were made about the nature of 'development', at least as it relates to agricultural production (George,1984; Shiva, 1991).

The failure of the technology transfer: diffusion-adoption method in 'Third World' countries highlighted the flaws in extension theory. The general response was to focus on the management and communication skills of agents to improve the extension service (Oakley, 1987). In fact, it could be said that the extension service response was a single-celled one, looking for a fine-tuning fix rather than an overhaul of the system.

As the flawed nature of technology transfer and diffusion theory exposed the tenuous thread by which technology leads extension services, the challenge presented itself to extension practitioners to re-think their situation. The social issues, principally accelerating rural poverty in the Third World for the majority, even among those who had been able to take up the new technologies, highlighted the neglect of the human resource in the method of the dominant model. Extension educators stopped focusing on the attitudinal changes required for a farmer to adopt a practise, and began considering the wider system--the socio-economic and environmental reasons that inhibited change. This lead to the recognition of the value of a systems or holistic approach.

Perhaps the most significant aspect of the shift from the individual, to the individual as a part of a community, was the recognition of the farmer as an adult learner, rather than a 'cog' in the 'development' wheel, and the community as a diverse group. As the door opened on education, extension workers were able to call on the innovative and widely acclaimed Latin American experience as typified in the 'conscientisation' process employed in adult literacy programs (Freire, 1972).

The placement of the farmer, as a social creature in the context of land, labour, market, and indeed all the impinging components of production, facilitated the re-thinking of the agricultural model. In simple terms: before there had been a focus on the production of the commodity; now that commodity was necessarily just one part of the system.

This vision of agricultural production as an element of a system then gave scope for consideration of an extension service that was flexible enough to deal with a myriad of issues. At the organisational and operational levels, government extension itself becomes part of a dynamic system. It is also a power shift from the government agent as central figure, to the farmer/activist on the landscape. In the Australian context this allows the recognition that there is a wider landscape, not just a crop.

To see the landscape, in its Australian context, is to see an ancient land. It is a land that has only been intensively farmed in the European manner for 150 years. However, it is a largely fragile landscape of many severely degraded and degrading sites (Ive and Cocks, 1988). Into this landscape it is now possible to paint the reality of that farmed environment -- the largely uncostable, non-renewable loss of fertility, soil structure and water quality.

In recognising the farmers as adults, the environment as a part of the agricultural landscape, production to be held in balance against resource depletion, the extension service has had to develop a systems approach. One or two contact farmers are not enough when effecting change impacts on a much larger numbers of farmers.

Worldwide, any extension services looked to the World Bank's development of the Training and Visit system as the way forward, and this may have been the original connection that the conservation manager made to 'Third World' extension models. However, very quickly in the Third World context it seemed that even when working with groups of farmers, the central problem was that the message was still about 'technical innovation' or as Roling (1988) describes it, TI rather than HRD -- human resource development.

LandCare as an extension model offers an interesting case study. It must be considered that as with many other policy issues, the intention of government in the creation of the landcare movement in Victoria, is different to the possible outcomes and benefits perceived by the participants in the groups. As previously stated, it is a reality that government departments are being severely cut back as part of the economic rationalist strategies of the '90's. It is clearly seen that less staff and the same amount of land, mean that a different form of government contact is required. Secondly, the shift in perception from family farm to small business enterprise has had a profound psychological impact on the significantly urban-based Australian population. There is little sympathy for the business that goes under, in economic hard times, as it is just one more victim of global recession. The cultural and even mythological value of the rugged individual, the 'cocky' who farms in adversity and is enshrined in Australian hearts refers to the family farmer, who is fast disappearing in the transformation wrought by the global market. Even as state and federal government promote LandCare as the way forward, there is a steady withdrawal of real cash support by government towards the maintenance of the agricultural tradition.

In this regard the environment movement, of which LandCare has now become an umbrella for rural conservation activity, comes at a fortuitous time for government. Funds can be invested in the environment movement, trees planted and the urban population appeased for much less than it would have cost previously to maintain the agricultural support system.

For the farmers, coupled with an aversion to being labelled 'green' is the profound shift to be made in the marriage of environment and agriculture. It is a transition from exploitation to cohabitation, and as such is extremely complex. At the state government level, the rapidly diminishing funds invested in conservation, are in opposition to the rhetoric that is being employed as to the importance of the landcare movement to the future of the state. There are similar contradictions at the local level. In the local farmers union, the Victorian Farmers Federation, farmers are linked along commodity rather than community lines. This is an important distinction, emphasising as it does the market loyalties of the rural population. However, a fundamental precept of LandCare is "genuine community development" (Campbell, 1991), a comment based on the need for farmers to link with neighbours, and in many cases create a community to clean up a creek or manage a land slip.

Methods

Reflecting that extension support for farming systems has largely still been based in technical innovation, it was with both trepidation and determination that as a long time extension practitioner, I asked five rural landcare groups to 'adopt' me into their groups for a three year period as a participant observer and action researcher--working on the human resource development side. The field research part of this project is very young and the interpretation that the community participants may put on events will no doubt influence the final presentation of this study.

This research is predominantly among dairy farmers in the high rainfall, steep slope ranges and low, undulating plains of south Gippsland, Victoria. These areas are largely cleared for agriculture or grazing. Land degradation issues include gully and tunnel erosion, land slips, declining streambank stability, tree decline and compromised water quality (DCNR, 1993).

The landcare groups are broadly representative of the wide range of interests within the LandCare umbrella. The group names reflect their origins and associations, for example, the Berry's Creek Ragwort Group, the Mt. Lyall FarmCare Group, the Fish Creek Land Care Group. Some of these groups are linked to the Farm Tree Association, one is a descendent of a Soil and Land Protection Group. Many receive funding from Greening Australia, One Billion Trees, Trees Victoria and federal Landcare funds, as well as state funding through the Department of Conservation and Natural Resources.

Despite many differences between Victorian farmers and their 'Third World' counterparts, the lessons surrounding community development as a core principle of agriculture and extension education are particularly important to the LandCare movement. Again, looking to Latin America (Lechner, 1990) reflecting on the outcomes of global agricultural policies, refers to the search for community that rural populations feel, as a form of "post modern solidarity". In the Australian context this may also be true, with LandCare having the potential to revitalise the rural areas through its purposeful mandate that draws neighbours together. In this way, the Wild Dog Creek LandCare group in Strzelecki, Victoria has developed from the Strzelecki Ragwort Group. Its activities include the re-vitalisation of the local community hall and tennis club in an area where the town itself no longer has a post office or primary school--government services reflecting declining populations. The creation of new communities, through common landcare interests, based on topographic links in a geographic region, offers the potential for a devitalisation of the countryside.

Extension agents use expressions like 'sustainable development' and 'sustainable agriculture'. Their work is no longer based in passing on technical innovations, but as rural extension agents facilitating group meetings and supporting decisions made in these meetings. As long as there is state or federal funding, these agents are seen as first contact for information, rather than as sources of power within the groups, though many of the groups are activated and maintained to date by the outside funding channelled through DCNR and its extension workers. (These funds are largely directed to trees and fencing out areas on recipient farms.)

There is room for conflict in this situation. Government agents experience diminished power, and are working in areas where their technical training is marginalised. Their particular skills are loosely defined as a resource to the groups in their areas, and as conduits of money and information networking. It is conceivable that as groups become more adept in linking with each other, and as funding continues to reduce, that the work of the extension agents will diminish even more. Victoria has already piloted part-time group co-ordinators whose wages are paid from group money (grants or subscriptions). Perhaps, more importantly, these coordinators are members of the community group itself, whereas extension agents are usually outsiders. As the groups become empowered, they are likely to challenge the government with regard to issues of relevance, as many have done recently with regard to the new Catchment and Land Protection Legislation (DCNR July, November 1993). Somewhat disappointingly from the perspective of extension staff, an early reading of this document would indicate that extension agents are to become legislation enforcement agents.

LandCare gives farm families an opportunity to support each other in the achievement of recognisable goals. The most dramatic in terms of the landscape, is the redrawing of the borders of a geographic region in order to reflect the real boundaries of the landscape. Thus farms in the same catchment become neighbours for the first time in the history of european settlement. At a cultural level, the new map offers a way of ordering, evaluating and monitoring the land from a perspective that cuts across the restraints and adopted values of the commodity driven agricultural production process. By uniting the landscape, its hills and vales, creeks and ponds with its agricultural purpose, economics potentially takes a back seat to the new land stewardship.

Unlike many parts of the world where the value of the land is measured in its yield per hectare, Australia and other frontier nations, rephrase this weighting to the number of hectares required to support a farmer. This emphasis on the individual is a particular difference with overseas counterparts. In Australia it is possible to acquire more and more land in order to remain viable, though the production per hectare overall may be continually declining, as it does in some of the salt affected areas of Victoria. There is increasing risk of farmers discarding farmed but degraded land and more intensively farming still productive hectarage. This is a little discussed factor in the publicised statistics surrounding increased yields on land under production. The question is whether a landcare movement of the future will be strong enough to inhibit such aggregation if it is seen by the community to be an unsound practise.

Conclusion and Educational Importance

At the state level, the result of successful up-take of catchment-community development through the landcare movement may involve leaving the state government policy behind, with the strengthening of local and regional alliances and the re-birth of the rural landscape. The re-created vista can then be based on the intertwining of agricultural production and conservation practise.

LandCare offers a model of community based activity reminiscent of the rural community structure that countries such as Canada and the USA keep alive in their memories and associations of farmlife--despite the ravages of international economies, declining rural populations and the commodification of these same farms. LandCare can learn from the 'Third World' model of extension that group meetings still based on technical innovation as the way to counter all problems is not, after all, the solution. Instead, the way forward is to look back at the history of the landscape and see the wider picture within which the agricultural system works. In this process, the importance of social organisation and human resource development are critical in shaping the future.

LandCare offers an enormous challenge to Australian society. In historically not valuing the land except for production, there are none of the usual attributes of community gathering along the new landlines. Australian roads, schools, meeting houses are not in line with the natural boundaries of the land. Logically connected as these waterways are, natural boundary lines as the hills may be, settlement patterns run across them, over them, through them, ignoring their inherent landscape structure. The community based on the natural landform, such as a water catchment, has no history and very little tradition. The lack of infrastructure within which the new communities are to evolve presents the ultimate challenge.

Faced with few resources and a loss of power, the extension agent's role must change in this landscape of the future. The extension agent must evolve to genuine grassroots participation wherein communities educate and learn from each other. This is likely to mean community or local government sponsorship, rather than state ownership. This is not to romanticise the potential for change in market driven societies. It is not possible to suddenly turn back the clock, other than to have a heightened awareness of the management needs of the Australian rural landscape.

It is important to be hard-headed about the realities of working in communities, the lack of homogeneity, the potential, often justifiable, 'pig-headedness' of those rugged individuals and the petty jealousies that may drive the extension of fence post boundaries. Still, by creating a flexible system that responds to the high degree of difference within the Australian anatomy, by allowing groups to be autonomous and self-regulating as they stand loosely under the LandCare umbrella, there is a chance that this soft system approach will work.

Extension practise is likely to become more of an administrative and consulting role than a teaching one. It is in fact a 'scientific revolution' as extension enters into a 'soft system' methodology (Wallace,1984). Currently there is somewhat of a void in the long-term planning for extension staff, and it is untenable if the responsibility for training extension agents from within or without of the community devolves solely on the declining rural population. Just as agricultural production cannot be seen as a sole focus, the fate of the rural sector of the country cannot be left to populist politics or interim planning. Agricultural and conservation policy must be based within an overall rural development strategy that has national and state-wide credibility. Once again, such strategies are many and detailed in 'Third World' countries. There is much that can be learned from developments there.

In the First World, extension praxis has centred on the individual and the rights of individuals in regard to their own land. This has often lead to the consequential neglect of the effect of individual actions on community resources such as soil and water. In the Third World, extension praxis has concentrated on the community, assuming a homogeneity that has in fact resulted in increasing disparities between people. In this paper a certain commonality can be recognised between First and Third World. Farmers, regardless of whether they are of the industrialised nations or Third World countries are subject to the global market, are conditioned by local and national politics and policies to have certain expectations, and are the product themselves of their society and national history. By recognising these socio-economic links, what emerges is the need for extension practise that locates farmers at the centre of their world.

In Victoria, Australia, the LandCare movement offers farmers the opportunity of 'community' action while respecting diversity between individuals and groups. It remains to be seen what role government will take in allowing this model to develop.

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PERSONAL NETWORKS AND AGRICULTURAL EXTENSION[1]

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INTRODUCTION

I was introduced to extension work on my first job in 1983 with the Agricultural Extension Unit of the Agricultural Mechanization Development Program (AMDP) of the University of the Phillipines-Los Banos (UPLB). I had neither theoretical nor practical background on extension but my agricultural engineering degree (which hardly had any extension nor behavioral sciences except for a semester of sociology in its curriculum) got me into the job. I equated extension then (I refer to agricultural extension when I say extension throughout this paper) to salesmanship and market competition. And as in any market-driven activity, product development was very important. My limited understanding of extension revolved around getting feedback from clients to make particular machines acceptable and competitive with other models. I was insensitive to most other issues outside the small machines domain.

In 1986 I moved into the much broader domain of rural development when I joined the newly-formed Appropriate Technology Unit (ATU) of IIRR. One of the best things I got from IIRR, relative to extension, is its integrated and holistic view of rural development with emphasis on human development. I could still remember that on my first two months in IIRR, I was not presented a particular set of job description. Instead, I was continuously fed with ideas to sort out relative to how I would wish to handle the task ahead. This was reinforced with a series of village visits and orientation on past and current programs of the Institute.

IIRR's guiding principles are embodied in the credo of rural reconstruction:

Go to the peasant people
Live among the peasant people
Learn from the peasant people
Plan with the peasant people
Work with the peasant people
Start with what the peasant people know
Build on what the peasant people have
Teach by showing, learn by doing
Not a showcase but a pattern
Not odds and ends but a system
Not piecemeal but integrated approach
Not to conform but to transform
Not relief but release!

(IIRR, Philippines)

NOTES

[1] Condensed from the author's masteral thesis of the same title and submitted to the School of Agriculture and Rural Development, University of Western Sydney - Hawkesbury, Richmond NSW 2753 Australia.

[2] Presently program researcher of IIRR

It was amidst this backdrop that I carried out my task of identifying and promoting small-scale rural industries in ATU. My background in agriculture also got me involved in the Unit's integrated and sustainable farming systems projects. This involvement gave me the chance to meet more extension staff of the Department of Agriculture which better contributed to my understanding of how they operate and what they are faced with in the field. In all these, however, AMDP never got out of the picture within which I operated. Since many of the ATU activities I was carrying out involved the need for small machines, my relationship with AMDP proved very helpful. The linkage (though not formalized at the Institute level) also gave AMDP the chance to reach out areas which it may have not reached on its own. At the same time, for the villagers, it expanded their list of outside contacts for assistance to the extent that they felt a degree of personal bond with some AMDP staff. I thus felt I was able to do more extension for AMDP while in IIRR than when I was in AMDP itself. It was also within this period that I realized that the government, having the most extensive agricultural extension network in terms of geographical coverage, would never have enough resources to reach out to everybody. So, unless the groups from remote communities take the initiative to reach out, they would not be recognized.

On above premise, I have developed the research towards complementing agricultural extension with relationship-based networks. These are networks based on personal ties like kinship, friendship, and patronage ties. It is now my belief that developing a system around such informal networks (particularly emphasizing on the positive attributes of kinship and friendship) vis-a-vis the formal social structures is the kind of system that will encourage the non-joiners to reach out more actively. By formal social structures I refer to groups like associations and cooperatives that have a set of officers and members guided by fixed roles based on rules and regulations (constitution and by-laws). They are often formed on the initiatives of outside groups - usually developmental agencies both from government and non-governmental organizations. These formal groups have (or are working towards achieving) legal personality to be able to deal with support systems which are often structured in a similar fashion.

To sum up, this paper talks of two inter-related themes: the potentials of personalizing extension and the expansion of its network base using informal and personal ties vis-a-vis the formal social structures.

PURPOSE

There are at least two general limitations of agricultural extension practice in the Philippines. The first is that the extension service does not have the resources to reach out to every individual in the country. And second, the current extension and rural development thinking is heavily focused on formalizing local organizations to the detriment of those who are unable to join them.

One way to overcome these limitations is to strengthen personal relationship-based networks. This requires a careful and balanced orchestration of both formal and informal social organizations. Existing social settings and institutions have to be taken advantage of by understanding how family members operate in them - singly and in groups.

On this note, the paper intends to put forward the proposition towards putting a more personal touch to agricultural extension practice - of enjoying the rewards in and consequences of valuing and understanding human relationships without necessarily having to give them the usual "legal personality".

METHODOLOGY

The findings presented in this paper stemmed largely from a field investigation and analysis that benefited from ethnographic and action research concepts. The Hawkesbury approach to action-based learning (which views agriculture from humanistic and systemic perspectives)had also been instrumental in going about the research.

The Hawkesbury approach to learning aims to "create a new breed of professional agriculturalists who can view agricultural issues in their complex wholeness and can take effective action towards a feasible and desirable change" (Bawden et al, 1981). The approach embraces a systems thinking and systems practice perspective, particularly on the soft systems aspect where "goals are unclear and problems are ill-defined" (Macadam, 1981: 85). It entails a hierarchy of methodologies for researching problems of increasing complexity - from soft system to hard system to applied research, and to basic research methodologies (Bawden et al, 1984). "As the methodologies range from reductionist to holistic, the choice of approach by the agriculturist is contingent upon the situation and stage in the research process. The approach also puts emphasis on learning theories to come up with informed debate - about desirable and feasible change among key participants in the problem solving process" (Bawden et al.1981). Such theories revolve around Lewin's (1946) and Kolb's (1971) learning cycle models of concrete experience --> reflective observation --> abstract conceptualization --> active experimentation. Concrete experience usually relates to the problematic situation and active experimentation is the step towards situation improvement. And since Lewin (1946) sees learning, problem solving and researching as the same process, the same learning cycle model is evident in each stage of Hawkesbury's hierarchy of methodologies.

Overall, this is largely an ethnographic account in a Philippine coastal village which aims to help improve agricultural extension practice.

The village in focus is *Barangay Alimsog* in the municipality of Sto. Domingo, Albay, Philippines. The village has been chosen for its relative remoteness to extension services despite being only about 13 kilometers from the town proper. The village is rarely visited by agricultural extensionists because to reach *Alimsog* would require either (1) traveling on foot along the hilly terrain or coastal shore of *Alimsog*; or (2) riding a motorized boat, weather permitting.

The actual period of stay in *Alimsog* was from October to December 1992. It then took another eleven months to make sense of the three-month *Alimsog* experience (making a thorough literature search as guided by feedback from various groups and persons).

RESULTS AND CONCLUSION

It is indeed difficult to capture the finer details of the dynamics of personal and family relationships on which the participation and network base of extension programs may be built on. To some extent this is captured in the story below which I have put together based on my conversation with people in *Alimsog*.

Relationship-based network systems

People know when to draw the line between friendship/personal relationships and business once they have "crossed the bridge". Once there, they are able to cope well. My impression is that the concern of many residents in *Alimsog* is to first "get across the bridge" in terms of getting assistance. What usually gives them the confidence to cross the bridge is having relatives or friends who have reached the other end (or more ideally, those who already belong to the other end). By doing so, they put to good use a system which will be termed relationship-based network in this paper. In going through such a network, the desired assistance is obtained through an interconnected series of actions, plans, and decisions. Subconsciously, they observe a concept of sequential decision making (Rosenhead, 1988: 197-98) or that of the theory of performance (Chambers, et al., 1989) wherein they try to keep their options open despite the very limited choices. Why it becomes relationship-based and of sequential decisions making process may be illustrated as follow:

If one village resident who is not a member of any of the village organizations decides to go into *burlap*[1] production, the first thing she will do is to make an inventory of the family's resources. Can her husband gather the *abaca* stalks? Can the children help in the stripping and in the drying of *abaca*? in making the twines and weaving? Will she have

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[3] Burlap is a mat made from abaca fiber: abaca is a fiber plant belonging to the same family as the banana plant.

enough time to make *burlap* on top of her regular household activities? If she finds "yes" answers to these questions, she then commits those resources to the planned activity. That is decision one.

She then goes to a close friend/neighbor whom she thinks will provide her the *abaca* stalks on credit. But because the friend/neighbor needs immediate cash for the stalks (otherwise his own family makes the *burlap* themselves), she is then accompanied to a middleman-friend in the village who can give her a loan to buy the stalks (or even provide her the *abaca* on credit) but has to sell her *burlap* to this middleman for an agreed flexible price (depending on how much the middleman is able to sell the *burlap* to his buyers). She agrees to the arrangement and that is decision two.

Later, in a time of emergency (e.g. illness in the family), she discovers she can also borrow money from the middleman not only for purchase of *abaca* stalks but for other domestic needs as well. So, she borrows extra money with the commitment that she will produce more *burlap* for the middleman. In the process, she actually commits more of her time and her family's resources into *burlap* production. That is decision three.

After several years, she hears of the launching of a *burlap* project by their village cooperative of which she is not a member. The project reportedly buys *burlap* at a better price/arrangement. She approaches her friend/neighbor again, who is a member of the cooperative, and explores the possibility of being involved in the project. After several conversations, she agrees to commit her *burlap* to the cooperative. Decision four.

Weeks later, she realizes she has cut off relations (but not friendship) with the middleman and now is unable to borrow money for emergencies or for purchase of *abaca* stalks. She cannot sell *burlap* to the cooperative because she does not have the raw materials. Unfortunately, she cannot get a loan from the cooperative because she is not a member. She is aware though that if she becomes a member, she could get the loan plus a greater possibility of being involved in other livelihood projects of the cooperative with support from development programs of government organizations (GOs) and non-governmental organizations (NGOs). However, she (nor her husband) cannot commit any of their time to attend regular meetings of the cooperative once either of them becomes a member. Their eldest child is only 12 years old and is not in a position to join the organization. In short, she decides not to join the cooperative and resumes her business relations with the middleman. Decision five.

From there, situations will be changing from time to time and each time, she will make new decisions as a consequence of the situations and resources at hand. She is constantly pursuing her long term plans as she lives by the day. Her friends/neighbors (who may not be in a position to tilt situations/policies in her favor) however, will always be instrumental in getting her involved in the new situations as a direct line of communication has been forged between them.

The above case speaks clearly of the ensuing sequentiality of decisions in a relationship-based network. The other implication is that subsistence farmers resist innovations because accepting an innovation means departing from a system that is efficient in minimizing the risk of a catastrophe for one that significantly increases this risk. To the cooperative, membership of the *burlap* weaver means increasing her chance to earn more in an equitable set-up. She, however, sees membership as less time to do weaving to attend to concerns of the cooperative and therefore, a likely decrease in income. Her "decision five" submits to Scott's (1976) subsistence ethic implying her action is based more on how the alternative can complicate or ease her problem of staying above the subsistence level crisis.

The idea of relationships as it may concern extension practice may be better contextualized by mapping the village social network structure based on the story just told. This is done in Fig. 1 where the non-joiner family (no membership whatsoever in the formal social structures) has been taken as the focal point of the mapping. This is done to define the non-joiner's "access route" to support systems like the extension service. Having done so, it is hoped that people outside the organized and active constituencies may be respected and recognized within the support systems - instead of being marginalized.

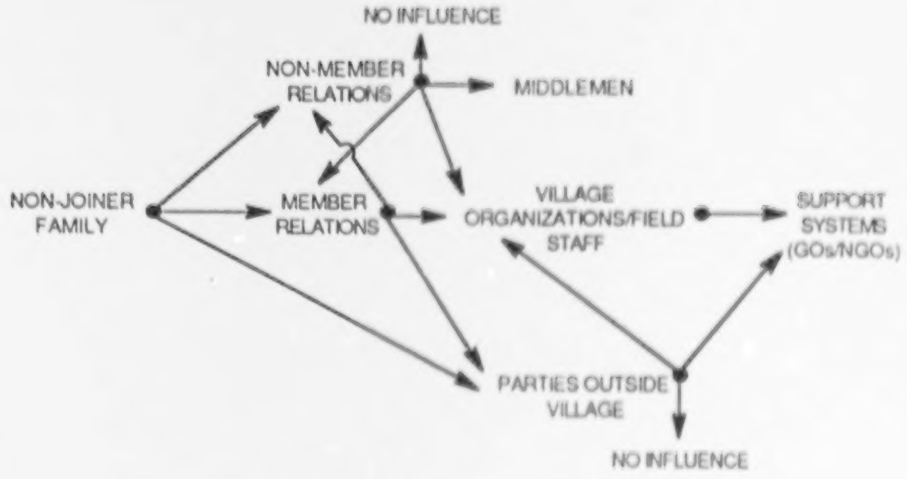

Fig. 1. A representation of the relationship-based network system for a non-joiner of formal organizations in *Alimsog*.

A Look at Kinship

Kinship is one of the most important organizers of human behavior and that marriage and family lie at the heart of this institution (Hunter and Whitten, 1976). It is the ties of loyalty, responsibility and privilege to people who are considered relatives. And although loyalties may be based on common territory, age, sex or shared social activity, political belief or social conditions, the kin group is a fundamental basis of social organization. In fact, kinship network is a basic form of social organization. It is a fact often overlooked by many development NGOs engaged in community mobilizing and organizing wherein the development trend is towards formation of organizations - mainly village associations and cooperatives.

A closer examination of the beginnings of associations and cooperatives facilitated by outside groups is likely to reveal that these associations and cooperatives attracted particular kin groups and later on expanded to cover other kin groups. Rate of membership by the other kin groups, however, largely depends on how open and flexible the original kin group is (who form the core of the association/cooperative). Otherwise, factionalism results. This value (factionalism) among Filipinos may have developed from the perception that one's environment is hostile so that the only way to forget harsh external forces is to turn inward and strengthen interpersonal bonds with a limited social circle (Agoncillo and Guerrero, 1977). It is thus in areas where there are several strong kinship groups with extremely conflicting views that development NGOs will find the most difficulty in dealing with factionalism. But inasmuch as we rarely find human groups united by one tie, it is in such situations wherein the value of casting a jural (not moral) relationship between kinship groups get accepted. If jural relationship prove very useful, then people will be tempted to seek the permanence of their ties by instigating a relationship of amity and then go so far as to ritualize their relationship to emulate kinship (i.e. ritual/fictive kinship). Still, one has to guard against the emergence of an abusive ruling class, who, upon securing his position, juralises the ties, invokes legal sanctions to insure fidelity, and amity becomes dispensable with at that stage (Goody, 1973). Such is the case of ill-famed patron-client ties. The extension system, however, should be able to handle and put to good use such attributes of ritual kinship.

Friends to Patrons to Kin

Referring to Fig. 1, what largely determines an outsider's access to any individual group in the network is initially dictated by the strength of ties that exist between the first person contacted and the individual/group intended to be reached. It appears a very hierarchical (and to some, exploitative) network. If it is indeed hierarchical, my impression is that both ends of the network are benefiting but that each end sees the benefit of the network ties in different angles. Those with a shorter path to the support system may see it as them getting the benefits/information first. And for a few of those with selfish motives, they can actually block the benefits/information from further filtering down the path. Those farthest from the support systems see the intervening ties as a shield to ward them off bureaucratic procedures and requirements without necessarily making them worse off. With the two views existing at the same time in the same place, it is no wonder that patron-client relationships have survived. This may be an oversimplification but the fact remains that patron-client ties are institutions in themselves. To some extent, it is a special form of friendship.

Recognizing that patronage may have evolved from friendship and then given permanence through the fictive kinship (or through jural provisions), this type of evolution of ties maybe what many extension workers may have failed to measure up to, making them (extension workers) less approachable compared to the village patrons. But what is there in friendship?

Goody explains that

> the notion of friendship is founded upon sentiment and that it is a particularistic relationship and not a general attitude. It is a relationship where (1) reciprocity is a must, and (2) moral equality is essential even between unequals as the only admissible reciprocity is in sentiment. (Goody, 1973: 96-7)

Inevitably, friendship and patronage ties will always be factors to contend with, or take advantage of, in extension programs/projects. What is perhaps needed is the encouragement of the proliferation of "good patrons" who would complement the agricultural extension functions relative to reaching the very poor.

Enroute to "Kinship" Extension

Fictive kinship and friendship ties present themselves as options to meeting a major and recurring concern in extension - strengthening linkages and communication between and among the rural poor and the various support systems. This, however, differs from "means to effective extension" in that the relationship these ties offer is an end in itself.

The potential value of kinship and friendship attributes in strengthening linkages relative to extension is evident in the relationship-based network systems that often exist in poor rural communities. It is a highly supportive and interactive system based on family, kinship and friendship ties cast more in moral, rather than jural, terms. This moral nature of the relationship puts communication among kin and friends on a highly interpersonal basis. This makes kinship tie attributes the more relevant as many agricultural extension people are now sounding off the need for an improved interpersonal communication with their clients.

I believe that an improved interpersonal communication may only be achieved if the relationship between the people and extension staff becomes an end in itself rather than simply being a means to implement programs. Some extension projects have failed in this respect by forcing the issue of formalizing village organizations, or, in taking advantage of indigenous/peer groupings, have inadvertently over-emphasized jural obligations at the expense of moral obligations (which have the higher value in Philippine rural communities).

There has been too much emphasis on how formalized social organizations can positively affect the development of the poor using successful formal organizations as models. Little, however, has been done to critically analyze how these successful formal organizations came into being. Replication of the success stories is more in recognition of the resultant structures than of the adaptive process that led to the structures. For example, I have yet to hear in community organizing work an acknowledgment pointing to real and fictive kinship ties as a strong formative base of a successful formal organization despite its having a membership comprised essentially of kin. As such, many cash-poor villagers view formal organizations (extension projects) as largely a "means" to alleviating their economic plight and likewise base their decisions to join/participate in them on that perspective. Those who decide not to join see the relationship rewarding only at the initial stage when their economic needs (usually through credit and dole-outs) can be met. They then see the relationship becoming unpleasant in later stages with the prospect of regular meetings they have not conditioned themselves to attend, or with the possibility of not being able to pay back loans. This usually results to non-joiners of formal organizations being marginalized and unreached by extension programs that put emphasis on organized constituencies.

With a complementary system based on kinship and friendship attributes, however, such drawbacks may be minimized. This is because friendship and kinship organization are both means and ends. They are generally rewarding relationships throughout one's life not only for being means to accessing minor services and small-scale needs but more so for their interpersonal and supportive moral (not jural) nature. But inasmuch as the resources in these ties are very limited among poor communities, such ties may need to be strongly complemented by formal organizations which can elevate the people's needs to the organized bureaucracy for administrative expediency. Therefore, the support system should be able to devise schemes wherein strong personal groups or networks may be recognized and be given some of the privileges available to formal organizations. Associate membership as practiced by some associations is a step in this direction. "Organizational sponsorship" is another possible option. By "organizational sponsorship" I mean a formal organization acts as a guarantor or sponsor for a strong informal group (e.g. kin group/network) that wish to negotiate with the support system or other formal institutions on a legitimate basis. This, in a way, is a variation of the *padrino* system in the Philippines (blamed for acts of corruption and nepotism). In the *padrino* system, a person in authority extends favor to an individual/group (often friends and kin) over more qualified individuals/groups by ignoring or circumventing policies. "Organizational sponsorship", however, is not to seek preferential rights that have unjust implications but simply an endorsement that can either be accepted or rejected based on merits of the endorsed party. It is more of strengthening formal-informal groups interface.

If the current extension programs are sincere in treating people as equals, co-learners and partners in the development process, then why not bring the relationship through development-focused friendship/kinship ties?

This paper has not endorsed any framework nor model in establishing relationship-based networks relevant to extension practice. The only major proposition here is the need for a conscious recognition of the value of friendship and kinship ties and their attributes to extension through a gradual and iterative process. It will be counter productive at this stage to assume that "relationship-based extension" can be structured to fit a general extension framework and adapted to specific situations later on. It will be counter productive because personal ties are particularistic moral relationships that need to be treated as an end in themselves and not means for the convenience of extension and technology adoption. Extension practice and personal ties, therefore, have to be treated as two separate but complementing goals. One is not merely a means to achieve the other - both are means and ends in themselves for a professionally and personally fulfilling life. The building up of relationship-based networks (bound by kinship and friendship attributes) is, therefore, a call not necessarily for the encouragement of peoples' participation in extension programs, but for the participation of extension in people's life-long activities.

EDUCATIONAL IMPORTANCE

In the final analysis, one major implication of a "personalized extension" in the education of would-be agricultural extensionists is that their curriculum has to place a heavier emphasis on the sociological and anthropological concepts. This is particularly relevant to non-agricultural extension or non-agricultural education students pursuing specialized agricultural courses (e.g. agricultural engineering) who are also likely to end up doing agricultural extension activities. They need a good grounding of said concepts in the same degree that they are endlessly fed with scientific facts. This is because in the end, it is people that they will have to work with. On this premise, they might as well be guided to understand human relationships and the value that such an understanding provides toward enhancing their respective professions.

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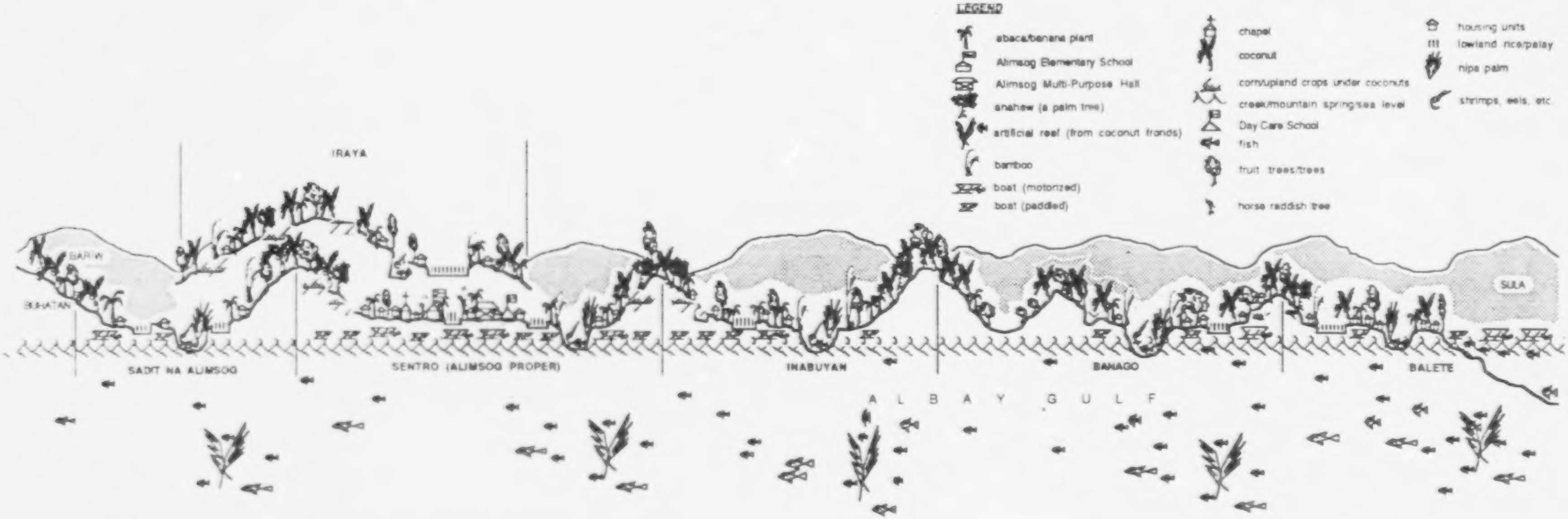
LEGEND
abaca/banana plant
Alimsog Elementary School
Alimsog Multi-Purpose Hall
anahaw (a palm tree)
artificial reef (from coconut fronds)
bamboo
boat (motorized)
boat (paddled)
chapel
coconut
corn/upland crops under coconuts
creek/mountain spring/sea level
Day Care School
fish
fruit trees/trees
horse raddish tree
housing units
lowland rice/palay
nipa palm
shrimps, eels, etc.
IRAYA
BARIW
BUHATAN
SULA
SADIT NA ALIMSOG
SENTRO (ALIMSOG PROPER)
INABUYAN
BANAGO
BALETE
ALBAY GULF

FIG. 2. A general profile of the six sitios (sub-villages) of Alimsog.

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TABLE 1 . A summary of agricultural systems characteristics of Alimsog.

	Sadit na Alimsog	Iraya	Alimsog Proper	Inabuyan	Banago	Balete
Ecosystem	coastal lowland upland	non-coastal lowland upland	coastal lowland upland	coastal lowland upland	coastal lowland upland	coastal lowland upland
Agricultural Systems Type	Mixed Systems subsistence to small scale fishing & farming - rice-based systems (irrigated/lowland) - coconut-based systems	Mixed Systems subsistence to small scale farming - rice-based systems (irrigated & rain-fed) - coconut-based systems	Mixed Systems subsistence to small scale fishing & farming - rice-based systems (irrigated/lowland) - coconut-based systems	Mixed Systems subsistence to small scale fishing & farming - rice-based systems (irrigated/lowland) - coconut-based systems	Mixed Systems subsistence to small scale fishing & farming - rice-based systems (irrigated/lowland) - coconut-based systems	Mixed Systems subsistence to small scale fishing & farming - rice-based systems (irrigated & rain-fed) - coconut-based systems
Cropping Patterns	Mixed cropping intercropping rotation cropping	Mixed cropping intercropping rotation cropping	Mixed cropping intercropping rotation cropping	Mixed cropping intercropping rotation cropping	Mixed cropping intercropping rotation cropping	Mixed cropping intercropping rotation cropping
Other livelihood sources aside from fishing & farming	burlap weaving (using abaca fibers) boat hire	burlap weaving, small stores, backyard animal production (pigs, chickens), hired labour, employees	burlap weaving, boat hire, small stores, backyard animal production (pigs, chicken, goats), small crafts (boatmaking, sewing, blacksmithing), hired labour, employees	burlap weaving, boat hire, backyard animal production (pigs, chickens), small stores, hired labour	burlap weaving, boat hire, backyard animal production (pigs, goats, chickens), small stores, hired labour	burlap weaving, boat hire, small stores, backyard animal production (pigs, chicken, goats), small crafts (boatmaking, sewing, blacksmithing), hired labour, employees
Social unit of production/ no. of households	individual households/3	individual households/15	individual households/72	individual households/12	individual households/8	individual households/24
General tasks of **men**	farming & fishing, household repairs, harvesting abaca fiber,takes care of carabao	farming, abaca harvesting household repairs, burlap weaving, ocassionally do household chores, collecting firewood, takes care of carabao	farming & fishing, abaca harvesting, burlap weaving activities, household repairs, ocassionally do household chores,collecting firewood, takes care of cattle/carabao/goats	farming & fishing, abaca harvesting, household repairs, ocassionally do household chores,collecting firewood, takes care of cattle/carabao	farming & fishing, abaca harvesting, ocassional burlap weaving activities, household repairs, ocassionally do household chores,collecting firewood, takes care of cattle/carabao, goats	farming & fishing, abaca harvesting, ocassional burlap weaving activities, household repairs, ocassionally do household chores,collecting firewood, takes care of cattle/carabao, goats
women	burlap weaving activities, household chores (cooking, laundry, child-minding, cleaning household, fetching water), assists in planting, weeding & harvesting	burlap weaving activities, household chores (cooking, laundry, child-minding, cleaning household, fetching water), assists in planting, weeding & harvesting, pig production	burlap weaving activities, household chores (cooking, laundry, child-minding, cleaning household, fetching water), assists in planting, weeding & harvesting, pig production	burlap weaving activities, household chores (cooking, laundry, child-minding, cleaning household, fetching water), assists in planting, weeding & harvesting, pig production	burlap weaving activities, household chores (cooking, laundry, child-minding, cleaning household, fetching water), assists in planting, weeding & harvesting, pig production	burlap weaving activities, household chores (cooking, laundry, child-minding, cleaning household, fetching water), assists in planting, weeding & harvesting, pig production
children	run household errands, assists in light farming activities & household chores	run household errands, assists in light farming activities & household chores (fetching water,cleaning house, babysitting younger siblings), takes care of chickens, assist in burlap weaving activities	run household errands, assists in light farming & fishing activities & household chores (fetching water,cleaning house, babysitting younger siblings), takes care of chickens, assist in burlap weaving activities	run household errands, assists in light farming activities & household chores (fetching water,cleaning house, babysitting younger siblings), takes care of chickens, assist in burlap weaving activities	run household errands, assists in light farming activities & household chores (fetching water,cleaning house, babysitting younger siblings), takes care of chickens, assist in burlap weaving activities	run household errands, assists in light farming activities & household chores (fetching water,cleaning house, babysitting on youngersiblings), takes care of chickens, assist in burlap weaving activities

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Session C TECHNOLOGY TRANSFER

1. **Variables Associated with Adoption and Non-Adoption of Pesticides by Plantain Farmers in the Dominican Republic**
   Thomas D. Rach
   Seung I. Na
   Curtis E. Paulson

2. **The Dairy Technology System in Venezuela**
   Rubén D. Nieto
   Janet L. Henderson

3. **Impact of Different Sources of Information on the Adoption of Pesticide Application Technology for Cotton Production in Taluka Sehwan District Dadu, Sindh, Pakistan**
   Abbasi Dur Mohammad
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   Mohammad Umer
   Mohammad Yameen

4. **Linkages Between and Among Researchers, Extension Personnel and Farmers in the North West Frontier Province of Pakistan**
   Khalid Nawab
   Layle D. Lawrence

5. **Major Determinants of Adoption Behaviour Among Cocoa Farmers in Trinidad and Tobago**
   Elbert Johnson

Variables Associated with Adoption and Non-Adoption of Pesticides by Plantain Farmers in the Dominican Republic

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Introduction

A pest is an organism that reduces the availability, quality, or value of some human resource (Flint & Bosch, 1981). Chemicals are most effective in quickly reducing pest populations where explosions occur (Headley, 1979). Pimentel et al. (1978) found that pesticides are an important means of pest control in the United States. The use of pesticides in developed and developing countries has made an important contribution to increased crop yields and improved human health (Flint & Bosch, 1981). Gough (1977) concluded that the use of pesticides has increased both yields and profits to the farmer as well as to national production. There is no doubt that considerable direct benefits are derived from the use of pesticides. The major dysfunctions of pesticides, however, are perhaps environmental contamination and the killing of wildlife.

A new comprehensive approach to pest control has been developing; it is termed integrated pest management (IPM). IPM is "an approach that employs a combination of techniques to control the wide variety of potential pests that may threaten crops. IPM involves maximum reliance on natural pest population controls, along with a combination of techniques that may contribute to suppression-cultural methods, pest-specific diseases, resistant crop varieties, sterile insects, attractants, augmentation of parasites or predators, or chemical pesticides as needed" (CEQ, 1972). IPM uses pesticides when systematic monitoring of pest populations and natural control factors indicates a need (Flint & Bosch, 1981).

Research on integrated pest management is going forward. White and Thompson (1982) found that the attitude of the farmer, farm size, and intensity of crop production were factors that affect the adoption of IPM. Napit, Norton, Kazmierczak, and Rajotte (1988) reported that a typical user of IPM is white, male, has some college education, has frequent contact with Extension agents, has a relatively large farm, has a higher than average farm income, and a higher then average percent of income from farming. The U.S.A. Federal Extension Service has been sponsoring educational programs for farmers and their advisors to improve their skills in pest management (Headley, 1979). Rach (1992) found that the area of greatest educational needs by Dominican plantain farmers was integrated pest management, followed by soil management, socioeconomic aspects of marketing and production, and seed technology and planting methods. Rach also reported that 54% of the Dominican plantain farmers use pesticides to control pests and of them, 45% receive information on its use from the government Extension service.

The adoption of farm technologies has been studied extensively in the past 50 years, however the need for further study in the area of the diffusion of innovations still exits (Rogers, 1983). Technology adoption has traditionally examined the following: the technology itself, the communication channel used, the time required for adoption, and the social system itself. Lionberger (1964) wrote that personal factors such as age, education and situational factors such as farm income, size of farm, and sources of information affect farmer adoption of innovations. Socioeconomic factors related to the adoption of new technologies include farmer characteristics and their environment. Small-scale farmers are later in adoption than large-scale farmers (Fliegel & Kivlin, 1967). Perrin and Winkelmann (1976) concluded that differences in farmer adoption behavior can be explained by differences in information, in the availability of inputs, in marketing opportunities, farm size, and farmer risk aversion or perception. Rogers (1983) concluded that past research has revealed important differences between adopters and non-adopters of innovations in (1) socioeconomic status; education, literacy, large farms, (2) personality variables; empathy and intelligence and (3) communication behavior; contact with Extension, knowledge of innovation and outside information sources.

Mekonnen (1991) found that farm size is the most important variable influencing technology adoption, and capital and Extension agents also have an important impact on the use of pesticides. Lambie (1983) stated that the major role of Extension agents is to facilitate the adoption of new ideas and practices. A better understanding of the actual behavior of those who use pesticides is an essential prerequisite for more effective control of pests and pesticides (Tait & Napompeth, 1987). The comparison of the adopters with non-adopters of an innovation generally will reveal systematic differences in the economic, social, and demographic characteristics of each group (Brown, 1981). However, there were no studies that examined variables distinguishing between adoption and non-adoption of pesticides by plantain farmers.

Purpose and Objectives

The purpose of this study was to identify variables that were associated with adoption and non-adoption of pesticides by plantain farmers in the Dominican Republic. Specifically the objectives addressed were:

1) To determine if the average discriminating scores of adopters of pesticides differ significantly from non-adopters.
2) To determine what variables are associated with adoption and non-adoption of pesticides.
3) To determine what proportion of the variance in the discriminant scores, adoption of pesticides, can be explained by the discriminating variables.
4) To determine the proportion of plantain farmers who can be correctly classified as being adopters or non-adopters of pesticides.

Methods

The design of this study was descriptive correlation. The study was designed to determine relationships between selected discriminating variables and adoption groups of pesticides. The target population for this study was all farmers who grow plantain in the eastern Cibao valley, the Dominican Republic. One hundred forty-four plantain farmers were selected using a geographical random sampling procedure. Geographical random sampling is a valid sampling procedure that has been used when the population can be defined geographically and no valid list is available (Donnermeyer & Mullen, 1987). A sample size of 144 is adequate to detect an r of .20 with a power of .80, which has been proposed as a convention for power (Cohen & Cohen, 1983).

Data were collected by face-to-face interviews using the questionnaire developed by Rach (1992). Three two-person interview teams conducted 12 interviews daily. The questionnaire included two parts. Part I consisted of 10 questions on selected characteristics of the farmers and innovation adoptions. Part II contained 13 statements to measure knowledge in integrated pest management. Respondents were asked to rate statements on a four-point Likert-type scale, based upon their perception of their current level of knowledge in the area of integrated pest management. Content and face validity of the instrument were determined by a panel of experts. The instrument was field tested with plantain farmers. An alpha reliability coefficient of .80 was computed to assess internal consistency.

Collected data were analyzed using SPSS/PC+ (Statistical Package for Social Science). For the analysis of data, the plantain farmers who have used pesticides in crops were designated as an adopter but those who did not use were designated as an non-adopter. The specific statistical technique used was discriminate analysis. The discriminant analysis is a statistical technique for studying simultaneously the differences between two or more groups with respect to several variables. All correlations were described using the Davis's (1971) descriptions. An alpha level of .05 was established a priori for determining significant differences.

Results

An examination of the means and standard deviations of the discriminating variables for adopters and non-adopters of pesticides (see Table 1) revealed that there were significantly differences between adopters and non-adopters of pesticide practices in terms of the following variables: Extension user, age, years of education, IPM knowledge, and fertilizer user. Plantain farmers who used pesticides in crops tended to be (1) users of Extension, (2) younger, (3) have more years of education, (4) have higher IPM knowledge scores, and (5) be fertilizer users.

The pooled within-group correlation matrix, obtained by averaging the separate covariance matrices for all factors and then computing the correlation matrix, was presented in Table 2. There was a very high relationship between years of farming and age (r=.86) and between monthly income and size of farm (r=.80) as would be expected. Years of education was negatively, moderately correlated with both age (r=-.53) and years of experience (r=-.53). IPM knowledge was moderately correlated with years of education (r=.30). Twelve other combinations of discriminate variables showed low correlations (with absolute values between r=.10 and r=.29).

Table 1

Means and Standard Deviations for Discriminating Variables

Discriminating Variable	Group Adopter (n=78) Mean	 St. Dev.	 Non Adopter (n=66) Mean	 St. Dev.	p
Extension User[1]	.56	.50	.27	.45	.0004*
Gender[2]	.91	.29	.97	.35	.2648
Age	49.06	16.32	54.65	16.68	.0446*
Years of Education	6.40	4.82	3.86	3.70	.0007*
Years of Farming	34.64	18.38	40.30	18.52	.0686
IPM Knowledge[3]	24.00	6.13	19.76	4.02	<.0001*
Farm Size[4]	179.61	546.22	64.77	108.49	.0953
Monthly Income[5]	9855.90	24795.15	5196.21	11224.03	.1610
Fertilizer User[6]	.59	.49	.39	.49	.0191*

Note:1 = yes 1, no 0; 2= male 1, female 0; 3= possible score range 0 - 36;
4= tareas; 5= pesos; 6= user 1, non-user 0
*:F-test significant at $p < .05$

Table 2

Pooled Within-Group Correlation Matrix: Discriminating Variables (n=144)

Variable	X1	X2	X3	X4	X5	X6	X7	X8	X9
Fertilizer User (X1)	1.00								
Extension User (X2)	.15*	1.00							
Gender (X3)	-.14*	-.02	1.00						
Age (X4)	-.12	-.06	.09	1.00					
Years of Education (X5)	.22*	.11	-.07	-.53*	1.00				
Years of Farming (X6)	-.15*	-.09	.13	.86*	-.53*	1.00			
IMP Knowledge (X7)	.08	.09	.14*	-.17*	.30*	-.19*	1.00		
Farm Size (X8)	-.10	.01	.05	-.10	-.04	-.06	.20*	1.00	
Monthly Income (X9)	.01	.07	.04	-.17*	.10	-.11	.16*	.80*	1.00

* : $p < .05$

Table 3

Summary Data for Discriminant Analysis (n=144)

Discriminating Variables	b	s	Discriminant Function 1	
			Group	Centroid
Fertilizer User	.20	.36	Non Adopters	-.60
Extension User	.46	.56	Adopters	.50
Gender	-.22	-.17		
Age	-.21	-.31		
Years of Education	.32	.55		
Years of Farming	.28	-.28		
IPM Knowledge	.59	.73		
Farm Size	.36	.56		
Monthly Income	-.24	.21		

Eigenvalue	Rc	Wilks' Lambda	p
.304	.483	.767	<.0001

b= Standardized discriminant function coefficient
s= Pooled within-group structure coefficient
Rc= Cannonical correlation coefficient

Table 3 reported summary data for discriminant analysis. The hypothesis tested with discriminant analysis was "in the population from which the sample was drawn, there was no difference between the group means (centroids) on the discriminate scores." The hypothesis was rejected at $p<.0001$ (Chi square = 27.9, df=9). The discriminant function explained approximately 23% of the variance in whether the plantain farmer was an adopter or an non-adopter of pesticides.

The standardized function coefficients indicated the relative importance of discriminating variables in the discriminating function. Table 3 showed that the farmer's integrated pest management knowledge, Extension user, farm size, and years of education were the discriminating variables with the highest association with the adoption of pesticides. However, monthly income, gender and age which were the lesser important discriminating variables more described the non-adopter group of pesticides.

Structure coefficients are product-moment correlations between discriminating variables and discriminating scores. The total structure coefficients equal to or over greater than .30 are considered as meaningful. The structure coefficients of the discriminating variables with the highest relationships to the discriminating function were IPM knowledge, Extension user, age, farm size, years of education, and fertilizer users.

Table 4 presented the classification of cases. Of the 144 cases analyzed, 71.5% were predicted correctly by the discriminant function in their respective membership groups. The percent of cases correctly classified indicates the accuracy of the procedures in the discriminant analysis. The value of Tau was calculated to be .431 indicating that the classification based on the discriminating variables resulted in 43.1% fewer errors than would be expected by random classification.

Table 4

Classification of Cases(n=144)

Actual Group	No. of Cases	Predicted Group Non-Adopter	 Adopter
Pesticide Non-Adopters	66	53	13
		80.3%	19.7%
Pesticide Adopters	78	28	50
		35.9%	64.1%

Percent of cases correctly classified: 71.5%

Conclusions

(1) Adopters of pesticides could be distinguished from non-adopters by the discriminating variables.
(2) IPM knowledge, use of Extension and farm size were the most powerful discriminating variables.
(3) Pesticide adopters tended to have larger farms, to be Extension users, to have more knowledge about IPM and to have more years of formal education;.
(4) The discrimination function explained 23% of the variance in the discriminant scores.
(5) The discriminate function correctly classified 71.5% of the cases (n=144).

Educational Importance/Recommendations

(1) Extension should focus on IPM in the planning of educational programs for plantain farmers to help them best control pests.
(2) Extension agents and specialists should play a role in facilitating that plantain farmers adopt safe methods of using pesticides in crops but stop using a dangerous pesticide.
(3) Extension agents and specialists should be trained with regard to IPM and communication skills for maximizing the rate of adoption of pesticide practices by plantain farmers.
(4) Research in adoption of pesticide practices should be studied being related to IPM because the overuse of pesticides will destroy environment as well as do harm human beings.
(5) This study should be replicated among plantain farmers in other countries as well as other regions of the Dominican Republic. Future studies should include additional variables (i.e., attitude of farmers toward an innovation) to attempt to account for the unexplained variance.

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THE DAIRY TECHNOLOGY SYSTEM IN VENEZUELA

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INTRODUCTION

Strong governmental policies are required for promoting and sustaining agricultural growth. The effectiveness of an agricultural technology system depends upon sound policies that support the agricultural sector. Formulating solid agricultural policies requires input from all parties involved in the system--policy makers, researchers, extension agents, farmers, and agribusinesses (Schuh, 1987). A major concern of many developing countries is increasing agricultural productivity; research plays a critical role in generating technologies that raise production levels. Research has been criticized for ignoring the production problems faced by small and medium-scale farmers and for neglecting to conduct site-specific, adaptive studies (Kaimowitz, 1991; Roberts, 1987; Cernea, Coulter, & Russell, 1985). One of the functions of extension is to transfer developed technologies and provide feedback from the users to the research subsystem. Extension has been criticized for lacking a clear mission, incurring excessive bureaucratic procedures, and being unresponsive to the problems and concerns of farmers (Rivera, 1991; Axinn, 1988; Baxter, 1987; McDermott, 1987). One of the main purposes of an agricultural technology system is to increase the adoption of improved practices by targeted clientele; adoption levels are affected by many factors, such as input costs, interest rates, and profitability. Users of agricultural technology need to be actively involved in the development and trial of improved practices (Compton, 1989; Pickering, 1985b). Strong linkages must exist among policy makers, researchers, extension agents, and farmers to ensure continued development.

Many research studies neglect to depict the relationships that exist among and within the various components of national agricultural technology systems. Analysis of agricultural technology systems should not be limited to isolated aspects, but rather the system should be examined comprehensively as a functional unit. A systems approach allows for a holistic examination of the interdependent components of an agricultural technology system. Investigating the strengths and weaknesses of a technology system provides a composite portrait of the system and identifies specific areas needing attention (Agricultural Extension, 1991; Roling & Engel, 1991; Waugh, Hildebrand, & Andrew, 1989).

PURPOSE AND OBJECTIVES OF THE STUDY

The main purpose of this research study was to describe and analyze the agricultural technology system in Venezuela with an emphasis on the dairy industry. The Analytical Framework developed by INTERPAKS (Peterson, Sands, & Swanson, 1989) was used to guide the research study and to identify the strengths and weaknesses of the Venezuelan agricultural technology system.

The objectives of the study addressed the four components of an agricultural technology system: policy, technology development, technology transfer, and technology utilization. The policy component examines those external factors that directly impact an agricultural technology system, including the utilization of technology by farmers. The objectives for the policy component focused on the government's investment in agriculture, pricing policies for agricultural products, credit availability for farmers, and farmer participation in decision making. The technology development component is the subsystem that is devoted to applied and adaptive research. The objectives for the technology development component focused on access to external sources of knowledge, human resources for agricultural research, research budgets, and allocations to agricultural commodity research. The technology transfer component refers to the transfer activities related to agricultural knowledge and inputs. The objectives for the technology transfer component concentrated on the access to technology from research, human resources for transfer activities, supervision and administration of extension personnel, time and budget allocations for technology transfer, and methods of technology dissemination. The technology utilization component refers to the use of agricultural technologies by farmers, with an emphasis on small holders. The objectives for the technology utilization component focused on the adoption of selected dairy technologies, farmer access to technology, and availability of technology to farmers.

METHODOLOGY

The design for the study was descriptive research. This research study examined the linkages among the four major functional components of the Venezuelan agricultural technology system, with particular attention to the strengths and weaknesses of the dairy technology system. The Analytical Framework, with its 18 indicators and 36 specific measures, served to organize and guide the data collection process.

Data were gathered from two main sources: government documents and interviews with people representing each of the four major components of an agricultural technology system. To substantiate the information gathered from government documents, selected members of the following agricultural groups were interviewed: a) policy makers (n=7), represented by administrators from the Ministry of Agriculture at the national and state levels, b) researchers (n=22), represented by professional agricultural researchers (Ph.D., M.S., B.S. or equivalent) and research technicians (Diploma and Certificate levels) from the National Institute for Agricultural Research, c) extension agents (n=18), represented by agricultural agents and assistants from the Ministry of Agriculture at the state and local levels, and d) dairy farmers (n=33), represented by small, medium, and large producers and selected members of dairy farmer organizations.

Two sets of instruments were used to collect the research data. The first set of instruments consisted of 25 data gathering sheets designed to collect secondary data from government documents. The published document entitled A Field Manual for Analyzing Agricultural Technology Development and Transfer Systems (Swanson & Peterson, 1989) was used to guide the construction of the data gathering sheets. The second set of instruments consisted of three interview schedules developed by the researchers. The primary intent of these interviews was to provide more in-depth information to help understand the linkages among the components of the Venezuelan agricultural technology system. Moreover, interview schedules were designed to go beyond the secondary data by addressing possible suggestions for linkage improvement among the components.

The data gathering sheets were considered valid instruments based on a series of case studies that used the Analytical Framework (Peterson, Sands, & Swanson, 1989; Peterson, Zuloaga, Swanson, Uquillas, & Crissman, 1988); the indicators and measures of the Analytical Framework have been found to be effective and efficient in describing agricultural technology systems in several countries. A panel of experts established content validity of the interview schedules. Reliability of the data sources was determined by the following methods:
a) interview schedules were used to confirm the accuracy of the data gathered through secondary sources, b) multiple interviews were administered to capture a full range of opinions

and perspectives of the Venezuelan agricultural technology system, and c) data were examined, whenever feasible, over a 10-year period to display trends.

Research data were collected in three phases: a) administering an introductory survey (n=16) during the Summer of 1991 with the purposes of describing Venezuelan dairy farmers on selected demographic characteristics, determining major problems and issues facing the Venezuelan dairy industry, and assisting in the design of the interview schedules; b) interviewing top-level administrators at the Ministry of Agriculture and the National Institute for Agricultural Research and gathering secondary data from government documents at the national level, and c) interviewing researchers, extension agents, and dairy farmers at the state and local levels. Phases II and III were conducted from November 20 to December 20, 1992.

Descriptive statistics were used to analyze the quantitative data. Percentages, frequencies, ratios, and index and access scores were calculated. Data obtained through the interview schedules were arranged by patterns and trends that emerged from the responses to the interview questions.

RESULTS

The Agricultural Policy Subsystem

Government expenditures for agriculture in Venezuela averaged 4% during the last 10 years; this percentage is similar to other Latin American countries (Peterson, Sands, & Swanson, 1989). The percentage of the Venezuelan Agricultural Gross Domestic Product (AGDP) invested in agricultural research was 1% or less between 1984 and 1992; extension expenditures were 4% during the same time period. These figures correspond with data from other developing countries (Swanson, Farner, & Bahal, 1990). Retail milk prices in Venezuela have been approximately twice as high as farmgate milk prices for the past six years. The gap between feed concentrate and milk prices is very low. Results of the interviews indicated that 64% of the farmers had credit and all farm-size categories had access to credit; however, the amount of paperwork involved was unreasonable, interest rates were high, and credit was not available in a timely manner. Even though a strong farmer organizational base exists with open membership, decision making, and elections, the organizations are generally controlled by large-scale producers and dairy processors. Farmers interviewed perceived that the organizations are extremely passive and have little influence in formulating dairy policies.

The Agricultural Research Subsystem

Accessibility to external sources of technical dairy information by agricultural researchers is low; contact with external sources of technology is indirect, infrequent, and primarily limited to central-level scientists. The ratio among Ph.D., Master's. and Bachelor's degrees for agricultural research in Venezuela is 7:49:44 compared to a desirable ratio of 20:40:40 (Peterson, et al., 1988). The ratio of agricultural technicians to research scientist is 1:1; the recommended ratio of technicians to research scientists is to 2:1 (Peterson, Sands, & Swanson, 1989). Thirteen percent of the public agricultural research budget is allocated to programs which is far below the recommended levels of 35% to 40% (Peterson, Sand, & Swanson, 1989); the remaining 87% of the budget is allotted to salaries and capital investment. Although the livestock subsector accounts for two-thirds of the AGDP, 21% of the research studies focus on the livestock area. Interview data confirmed that the public research agenda is oriented toward export crops rather than domestic crops and livestock, especially dairy.

The Agricultural Extension Subsystem

Three-fourths of the extension personnel interviewed indicated that direct contact between public research and extension personnel never occurred or was on an *ad hoc* basis. Although 47% of extension personnel have a university degree, less than 5% have a Master's or Ph.D. degree. Even though some extension personnel specialize in specific technical areas, the

Subject Matter Specialist position does not exit in the Venezuelan public extension subsystem. The majority of the extension personnel interviewed stated that annual evaluations are conducted and the results are distributed, but not discussed. Pay is not awarded on a merit basis and promotions are not based on performance. The time spent on educational activities by the extension personnel interviewed averaged 49%; one-fourth of their time was devoted to non-educational, regulatory activities, while the remaining 25% was allocated for administrative duties. The amount of funding allotted to programs and salaries is extremely inadequate according to the extension personnel interviewed. In addition, extension salaries are far below other institutions in the public and private sectors. The group activities most frequently used by extension agents to transfer technical information to farmers were demonstrations, meetings, and seminars; the average number of demonstrations conducted per extension field agent per year was 12. Flip charts, posters/bill boards, and leaflets/fact sheets were the types of media most frequently used to transfer technical information. The public extension subsystem does not use the radio as a means for transferring technical information.

The Technology Utilization Subsystem

Although the majority of the farmers in the study had knowledge of mastitis prevention, improved forages, feed concentrates, and artificial insemination, those practices that required higher input costs, modern equipment, specialized personnel/skills, and sophisticated management abilities were adopted less frequently. The main reasons for non-adoption of the improved dairy practices were: high cost, lack of equipment/facilities, lack of information, and low quality inputs. High school/university courses and educational programs conducted by the public extension subsystem were the most frequently mentioned sources for learning about the practices regardless of farm size or the specific dairy practice. The farmers in the study were located an average of 28 kilometers from the nearest agricultural supply outlet, with a range between two and 70 kilometers.

Characteristics of the Venezuelan Dairy Industry

Milk production represented 21% of the total value of Venezuelan agricultural products in 1991 (Observaciones a la Política, 1992). Milk production levels decreased by 4.3 % from 1989 to 1992 and the amount of milk available per capita has decreased by 45% over the past six years (Piñate, 1992). Venezuela imported 27% of the total milk consumed in 1991; a projected milk deficit of 1 billion liters is expected by the year 2000 (Piñate, 1992). Eighty percent of the milk processed in 1990 was in the form of powered milk and cheese (Estadísticas Pecuarias, 1990). The major dairy breed in the country is a cross between the Zebu and Brown Swiss or Holstein. Feed concentrates are seldom fed to traditional dairy breeds due to the low rate of economic return; dairy cattle are usually fed low quality forages on home-grown pastures. Although large-scale farms represent 11% of the total number of dairy operations, they account for 44% of the total milk production (V Censo Agrícola, 1988).

Major Problems Facing the Venezuelan Dairy Industry

Respondents representing policy makers, researchers, extension agents, and dairy farmers were asked to identify the major problems facing the Venezuelan dairy industry. The main problem mentioned was unfavorable governmental policies, such as low milk prices, high input costs, elimination of dairy subsidies, a lack of low-interest agricultural credit, a monopoly in the milk processing industry, a lack of continuity in governmental support for research and extension programs, and a high reliance on imported dairy products. Another area of concern was milk production constraints including, a lack of dairy breeds suitable for the tropics, poor dairy management practices, a lack of high-protein forages, herd health problems, a shortage of dependable labor, and a deficiency in updated dairy technology.

Improving Linkages among Researchers, Extension Agents, and Farmers

Several suggestions for improving the linkages among researchers, extension agents, and farmers were provided by the respondents; the recommendations can be grouped into three areas. The first area encompasses the integration of extension and research activities by collectively establishing short and long-term priorities, developing a joint plan of work to coordinate ideas and programs, establishing regular meetings between research and extension administrators, meeting on a regular basis to discuss research results, assigning extension personnel to research stations to conduct transfer activities, organizing an advisory committee at every research station that includes researchers, extension agents, and farmers, and encouraging interdisciplinary work groups between research and extension personnel. A second area of recommendations centers around the development of the public agricultural research agenda; suggestions included, conducting research based upon the needs of specific regions, working directly with farmers to assess clientele needs, collectively conducting surveys to diagnose "real" problems to be researched, and creating experimental substations throughout the country. A third area included suggestions offered by farmers for improving the public research/extension subsystems: researchers/extension agents should spend more time in the field and less time in the office, dairy specialists are needed in each state, courses and seminars that focus on regional differences and specific dairy production information should be conducted, research/extension personnel should coordinate their efforts with regional universities, and field trials should be coordinated by research/extension.

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The Agricultural Policy Subsystem

The Venezuelan government's financial commitment to the agricultural sector is too low to promote growth and sustain development. If funding for the agricultural sector is inadequate and unsteady, then governmental policies will have little impact on production and productivity (Agricultural Extension: The, 1990; Baharsjah, 1985; Pickering, 1985a). Increasing and maintaining the percentage of the Venezuelan government's total budget allocated for agriculture to a minimum of 5% is recommended to attract more people to agriculture and stimulate growth in the sector.

Funding levels, as a percentage of the AGDP, appear to be adequate for developing and disseminating new technologies and improved practices. Adequate funding levels and increased governmental support for research and extension will result in increased agricultural output (Compton, 1989). Maintaining current expenditures for agricultural research and extension is recommended to encourage self-sufficiency and less dependence on imports for the Venezuelan agricultural sector.

Current pricing policies for dairy products favor the dairy processor and discriminate against the producer. When the input/output price ratio is unattractive, the incentive to use new technology and modern inputs is reduced (Schuh, 1987). Increasing the farmgate milk price in relation to the retail price and expanding the feed concentrate to milk price ratio are recommended to attract farmers to the dairy industry and to promote the use of improved inputs.

Although agricultural credit is available, interest rates are high, loan application procedures are excessive, and availability of credit is untimely. When credit policies and procedures do not favor the agricultural sector, many farmers are unable to purchase and use improved inputs (Schuh, 1987). To increase farmer use of agricultural credit, the Venezuelan government should set interest rates that correspond to the profitability of agricultural enterprises. In addition, shortening and simplifying the loan application process is recommended to increase credit use by farmers.

Venezuela has a strong base and structure for farmer organizations as evidenced by the high index ratings and farmer interviews. The needs of small and medium-scale farmers are not likely to be addressed by policy makers, unless farmer organizations represent all levels of producers. Medium and small-scale farmers must become more proactive and united in voicing their problems and concerns through farmer organizations (Agricultural Extension: The, 1990; Pickering, 1985b).

The Agricultural Research Subsystem

Public researchers have limited access to direct sources of external dairy technology and information. A lack of direct access to external knowledge and technology delays the technology development process and results in unnecessary research investments for developing countries. To maintain a viable national research subsystem, scientists must network with colleagues throughout the world to keep up to date and to use resources more efficiently (Cernea, Coulter, & Russell, 1985). Increasing direct and frequent contact with the International Agricultural Research Centers (IARCs) and other external research institutions is recommended to ensure continued growth of the Venezuelan public research subsystem; contact with external sources of technical information should also be made available for researchers at the local experiment stations.

The current number of public researchers with advanced degrees (i.e., Master's and Ph.D.) is extremely low. The educational level of scientific staff and technicians is positively related to the performance of research institutions; a critical mass of qualified scientists is necessary for long-term technology development (Peterson, Sands, & Swanson, 1989). Increasing the number of Ph.D. scientists to the recommended level is suggested for strengthening the public agricultural research capacity in Venezuela.

The monies allocated for public research programs are insufficient to fulfill the goals and objectives of the Venezuelan agricultural research institute; similarly, monies allotted for salaries are not competitive with comparable institutions. When programming budgets are below the recommended levels, research activity and productivity are severely restricted. A study jointly conducted by the United Nations Development Programme and Food and Agriculture Organization for the United Nations (FAO) reported that the disproportionate allocation between salaries and programming expenses is a major factor contributing to the under-utilization and low motivation of research personnel (Peterson, Sands, & Swanson, 1989). Without adequate programming support, research staff are not able to design, implement, and complete scientific investigations. Reducing the portion of the research budget allocated for salaries by "freezing" vacant positions is recommended to increase the monies available for research programming.

The public agricultural research agenda overemphasizes export crops and overlooks the domestic crop and livestock subsectors, especially dairy. The amount of investment in specific commodities should correspond to their contribution to the AGDP (Swanson & Peterson, 1989). Research programs that emphasize export commodities for foreign exchange establish a high concentration of large-scale, resource-rich farmers, neglect small-scale farmers, and create food shortages (Peterson, Sands, & Swanson, 1989). As stated by the World Bank (cited in Peterson, Sands, & Swanson, 1989), investment in domestic food crop research increases the quality of life in rural and urban areas and creates a surplus for possible exportation. Not only economic factors, but also social and resource-use issues must be considered when setting research priorities (Peterson, Sands, & Swanson, 1989). Reallocating research personnel and programming budgets to the livestock and domestic food crop subsectors is recommended to reduce dependency on foreign food imports.

The Agricultural Extension Subsystem

The linkages between the public agricultural research and extension subsystems in Venezuela are weak, informal, and inconsistent. Without strong linkages between the research and extension subsystems, agricultural development will be hindered (Roling & Engel, 1991; Colle, 1989; Waugh, Hildebrand, & Andrew, 1989; Cernea, Coulter, & Russell, 1985). When research and extension linkages are poor, the prospects of research findings reaching the farmers and accurately assessing farmer needs are unlikely (Baharsjah, 1985; Pickering, 1985a). The realization of the mission and objectives of the research and extension subsystems is hampered when the two institutions work in isolation. Establishing a formal research/extension communication network with strong administrative support is recommended to link the two institutions.

Personnel with Ph.D. or Master's degrees are under-represented in the public extension subsystem. The disparity between the educational levels of researchers and extension agents is not conducive for joint efforts. The lack of personnel with specialized graduate degrees weakens the agricultural technology system, in general, and prevents effective communication between the research and extension subsystems (Rivera, 1991; Axinn, 1988; McDermott, 1987; Pickering, 1985b). Increasing the number of extension personnel with graduate degrees and establishing a Subject Matter Specialist position within the extension subsystem is recommended to improve the human resource capacity of extension and research-extension linkages.

The appraisal and compensation systems of the Venezuelan extension subsystem do not encourage motivation, job satisfaction, and quality performance among extension personnel. The fulfillment of the goals and objectives of an organization are threatened by the inefficient management of human resources (Peterson, Sands & Swanson, 1989). When evaluation procedures and criteria are established and distributed, but not applied, then employee trust, motivation, and performance are jeopardized (Kaimowitz, 1991). The recruitment and retention of qualified personnel is hindered by weak compensation systems; maintaining an effective organization depends partially upon the presence of positive incentives (Fisher, Schoenfeldt, & Shaw, 1990). Designing an evaluation process that provides opportunities for improving job performance is recommended to maximize employee potential in the public agricultural extension subsystem in Venezuela. Revising the current compensation system of the extension institution to be based on performance rather than seniority is recommended to improve the recruitment and retention of qualified personnel.

Extension field agents do not devote sufficient time to educational activities that promote the utilization of new technologies and improved practices. When too much time is spent on non-educational activities, the main purpose and objectives of an extension subsystem are not fulfilled (Swanson & Peterson, 1989). In addition, as a consequence of spending too much time in the office, extension field agents lose credibility and are unable to accurately assess farmer needs (Axinn, 1988). Recognizing the importance of the educational function of the extension subsystem is recommended to increase the amount of time devoted to the transfer of new technologies. Streamlining the quantity of paperwork and administrative reporting is also recommended to encourage a more efficient use of the extension agents' time.

Funding levels allocated for public extension programming appear to be insufficient to carry out technology transfer activities in Venezuela; similarly, salaries for extension personnel do not seem to be competitive with similar institutions. The transfer of improved technologies to farmers may be detained when disproportionate amounts of monies are designated for salaries, programs, and capital expenditures (Rivera, 1991; Wilson, 1991; Peterson, Sands, & Swanson, 1989). When insufficient amounts of funding are assigned for extension programming, field agents lack teaching materials, transportation, equipment, supplies, and communication devices to effectively perform their responsibilities (Peterson, Sands, & Swanson, 1989; Axinn, 1988). Low salaries and inadequate benefits are related to high employee turnover and low motivation and job satisfaction/performance (Fisher, Schoenfeldt, & Shaw, 1990). Increasing the amount of the budget allocated for extension programming is recommended to ensure the adequate transfer of new technologies and improved practices by extension field agents. Raising the salary levels for field agents to a more competitive base is recommended to recruit and retain qualified personnel.

Extension field agents are reaching a high percentage of the farming population through a variety of group activities. The overall capacity of an extension subsystem to transfer new technologies is enhanced by contacting a majority of the farming population using a variety of dissemination techniques; the more individual and group activities held, the greater the likelihood that farmers will adopt new technologies (Peterson, Sands, & Swanson, 1989). Increasing the number of individual farm visits by extension field staff, especially to small-scale farmers, is recommended to encourage the utilization of new technologies and to accurately assess the problems and concerns of all farmers.

The Technology Utilization Subsystem

The dairy farmers in the study are aware of the major practices for improving milk production: artificial insemination, feed concentrates, improved forages, and mastitis prevention. Although knowledge of an existing practice does not guarantee its usage, awareness is a first step in the adoption process (*Agricultural Extension*, 1991; Rogers, 1983).

The adoption rate is low for recommended dairy practices that require higher financial investment, specialized equipment, and sophisticated management skills. If increased productivity is a high priority for the agricultural sector, then the barriers impeding the adoption of improved technologies need to be removed (Kaimowitz, 1991; Roberts, 1987; Feder, Just, & Zilberman, 1982). Addressing the economic, political, social, institutional, and infrastructural factors preventing the adoption of new practices is recommended to improve productivity and increase farm income.

Agricultural supply outlets are distributed throughout the country and are accessible to the dairy farmers in the study. The close proximity of farm households to supply outlets facilitates the use of new technologies and modern inputs.

GENERAL RECOMMENDATIONS

This study attempted to examine in a holistic manner the strengths and weaknesses of the Venezuelan agricultural technology system with an emphasis on the dairy industry. Through the comprehensive analysis of the system as a functional unit, the linkages among policy makers, researchers, extension agents, and farmers were found to be weak or non-existent. Several constraints were identified that are hindering the progress of the agricultural sector in Venezuela. To improve the Venezuelan agricultural technology system, the following recommendations are proposed: a) establishing governmental policies that provide a long-term commitment to the agricultural sector will secure the design, implementation, and completion of research and extension programs; proactive and influential farmer organizations will help to ensure continuity of agricultural programs and services during administrative changes; b) the public research and extension subsystems should consider forming a national committee composed of small, medium, and large-scale farmers and representatives from private and public agricultural agencies/industries to design the national agenda for the agricultural sector; developing short and long-term strategic plans will help to determine the role that the agricultural sector should play in the Venezuelan economy and in the welfare of the population for the 21st century; c) examining the philosophy, mission, goals, and objectives of the public research and extension subsystems will ensure compatibility with the agricultural needs and priorities of the country; identifying the populations that should be served by the public research and extension subsystems and assessing clientele needs will ensure the effective use of human and financial resources and the design of the research and extension agendas; and d) implementing on-farm adaptive research on a trial basis at selected experiment stations will improve the linkages among researchers, extension agents, and farmers and enhance the credibility of public agricultural personnel among farmers. If the weaknesses in the Venezuelan agricultural technology system are not addressed and corrected, then the agricultural sector will remain depressed, non-competitive, and inefficient.

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IMPACT OF DIFFERENT SOURCES OF INFORMATION ON THE ADOPTION OF PESTICIDE APPLICATION TECHNOLOGY FOR COTTON PRODUCTION IN TALUKA SEHWAN DISTRICT DADU, SINDH, PAKISTAN

Introduction:

Pakistan is an agriculturally based country with more than 70% of its population directly concerned with agriculture production. The main crops of Pakistan are divided into two groups i.e. cereal and cash crops. Cotton is major cash crop. The major cereal crops are wheat and rice.

With the introduction of high yielding varieties cotton yields have increased, but there still is a wide gap between potential yield (yield which is reported by scientists) and the actual yield (yield which farmers get from their farms).

According to rough estimates 15-20 percent of the cotton crop is reduced nearly every year by the attack of insect pests. Losses go as high as 30-40 per cent (Mallah 1984).

Scientists in the field of crop protection have taken continuous efforts to overcome the problem of the insect pests. Also pesticide companies with the collaboration of national scientists working at research stations have introduced insecticides which are very effective, but farmers are still unable to reduce the losses caused by insect pests. One of the main reasons for this failure is the lack of know-how. Information regarding diagnosis of insect pests, proper time, dose and handling of the insecticides/pesticides is not properly communicated to the farmers.

Communication channels play a vital role in transferring the scientific knowledge to its end-users. Effectiveness of information media varies from crop to crop, technology to technology, and farm to farm. This study was designed to determine the impact of different sources of information on the adoption of pesticide application technology for cotton in Taluka Sehwan, District Dadu.

Purpose of study

The study was conducted to accomplish the following objectives:

1. To investigate different sources through which information reaches farmers.
2. To determine the most effective sources of information regarding pesticide application technology as perceived by farmers.

Methods and Procedures

The present study was conducted in Taluka Sehwan, District Dadu Sindh Pakistan during 1992 to determine the impact of different sources of information on the adoption of pesticide application technology for cotton crop. The study was confined to Taluka Sehwan because of the following reasons:

1. Study of whole district was not possible due to limited time and money available with researcher.

2. No study was previously conducted to evaluate the effectiveness of different sources of information of pesticide application technology for cotton crop in Taluka Sehwan, District Dadu, Sindh, Pakistan.

Sampling Technique:

There are twelve Dehs (villages) of Taluka Sehwan where cotton is being grown. Five Dehs were randomly selected in the sampling are. Fifty cotton growers were chosen from selected Dehs. Ten growers were selected at random from each selected Deh. Thus making a total sample of fifty respondents. The list of cotton growers of selected Dehs was obtained from the Revenue Department of government of Sindh.

Collection of Data:

After selecting the sample a detailed questionnaire was prepared to serve as a tool for the survey. This questionnaire contained queries regarding literacy status, size of holding and questions pertaining to the various sources of information influencing the adoption of pesticide application technology for cotton crop in study area. These questions were grouped under eight aspects of pesticide application. After detailed discussions with progressive farmers and experts of the field, eight sources of information were identified and included in the questionnaire. A 1-5 point likert type scale was used to measure the response regarding the effectiveness of each source of information. The explanations attached with the five points of the scale were: 1=very high, 2=high, 3=moderate, 4=low and 5=very low impact. All the respondents included in the study were personally interviewed by the researcher at their farms.

Results and Discussions:

The results are divided into two parts. In the first part demographic characteristics of the respondents are discussed, the second part deals with the effectiveness of various sources of information.

Demographic Characteristics:

Questions regarding literacy and holding of the sample cotton growers were included in the questionnaire used in this study. The results are presented in Tables 1 and 2.

Table 1 shows that more than half (56%) of the growers were illiterate and were unable to read and write. This means that extension agents need to be continuous in selecting sources of communicating new ideas to the farmers. Extension agent must not depend upon printed material alone.

Table 1. Literacy status of the cotton growers of Sehwan taluka:

Sr. NO.	Literacy Status	Number	Percentage
1.	Literate	22	44
2.	Illiterate	28	56
	Total	50	100

Table 2 indicates that 60 percent of the cotton growers were small farmers having the farm size of 1 to 12.5 acres. This was followed by medium and large size farmers, who constituted 28 and 12 percent of the sample farmers, respectively.

Table 2 Farm size of the Sample Cotton Growers of Sehwan Taluka.

Sr. No.	Size of holding (Acres)	No. of Sample growers	Percentage
1.	1 to 12.5	30	60
2.	12.6 to 50	14	28
3.	51 and above	6	12
	Total	50	100

Effectiveness of various sources of information was the main objective of this study. Respondents were asked about the appropriateness of media regarding pesticide technologies. Results are presented in Table 3 through Table 10. There are various steps and aspects of pesticide technology; the very first step is diagnosis, for which data are presented in Table 3.

Table 3 Means, standard deviations, and ranks for the sources of information regarding pest diagnosis.

Sr. No.	Sources of Information	Mean	S.D.	Rank
1.	Agriculture Extension	2.34	1.36	1
2.	Manufacturing Companies	2.64	1.26	2
3.	Television	3.68	1.13	5
4.	Radio	3.48	1.20	4
5.	Press (News papers)	4.24	1.06	7
6.	Printed Material (Posters,Leaflets)	3.74	1.21	6
7.	Neighboring Farmers	3.04	1.35	3

Table 3 Indicates that agriculture extension (2.34) was the most effective source for pest diagnosis,a finding that agreed with reports of Inayatullah (1962), Mallah et al. (1987) and Sinha (1965). Manufacturing companies (2.64) played a significant role in this regard after agriculture extension. Neighboring farmers (3.04) got 3rd rank. After these radio (3.48), television (3.68), printed material (3.74) and press (news papers) (4.24) were also perceived as helpful sources of information.

After pest diagnosis, the second step is to select an appropriate pesticide to overcome the problem. The data regarding effectiveness of various sources of information for this technology are presented in Table 4.

Table 4 Means, standard deviations, and ranks for the source of information regarding types of pesticides.

Sr. No.	Sources of Information	Mean	S.D.	Rank

1.	Agriculture Extension	2.32	0.9988	1
2.	Manufacturing Companies	2.64	1.3211	2
3.	Television	3.5	1.2817	5
4.	Radio	2.75	1.0654	3
5.	Press (News papers)	4.0	1.2289	6
6.	Printed material (Posters etc.)	4.1	1.2330	7
7.	Neighboring Farmers Farmers	2.78	1.3292	4

Data shows that agriculture extension (2.32) remained the top ranking source of information. This finding is in agreement with Inyatullah (1962), Mallah et el. (1987) and Sinha (1965). Manufacturing companies (2.64) were next to the agriculture extension, radio (2.75) proved itself as the number three top ranking source of information. Other sources of information, i.e. neighboring farmers (2.78), television 3.5), press (4.0) and printed material (4.1), were also perceived as important sources and were given rank number 4, 5, 6, and 7, respectively.

Another variable was the attacking time of pests, therefore, pesticide application at the proper time is of great importance. Information gathered in this regard is presented in table 5.

Table 5 Means, standard deviations, and ranks for the source of information regarding time of the pesticide application.

Sr. No.	Source of Information	Mean	S.D.	Rank
1.	Agriculture Extension	2.34	0.981	2
2.	Manufacturing Companies	2.24	1.0021	1
3.	Television	3.22	1.1301	5
4.	Radio	2.88	1.1256	3
5.	Press (News papers)	3.7	1.0738	6
6.	Printed Material (Posters etc.)	3.7	1.4033	7
7.	Neighboring Farmers	3.2	1.5779	4

Table 5 shows that manufacturing companies (2.24) were on the top in guiding the farmers for appropriate time of pesticide application, this is also supported by Chandio (1992), as include in table 5 agriculture extension (2.34) stood 2nd and radio (2.88) remained 3rd top ranking source of information. This is in conformity with Rehman (1970), Rathore (1989), and Mallah et al (1987) who are of the opinion that radio is among top ranking sources of information like agriculture extension or local leaders. Other sources of information i.e. neighboring farmers (3.2), television (3.22), press (3.7), and printed material (3.7) are presented in the order of their effectiveness.

The fourth step is to convey information about spraying techniques as well as dose calculation. The respondents were asked to rank the effectiveness of sources for spraying techniques and dose calculation. The responses are presented in Table 6.

Table 6 Means, standard deviations, and ranks for the source of information regarding spraying technology and dose calculation.

Sr. No.	Source of Information	Mean	S.D.	Rank
1.	Agriculture Extension	2.48	1.1292	3
2.	Manufacturing Companies	2.34	1.0224	1
3.	Television	4.12	1.1364	6
4.	Radio	2.8	1.1605	4
5.	Press (News papers)	4.44	0.9071	7
6.	Printed material (Posters etc)	2.38	1.0279	2
7.	Neighboring Farmers	2.98	1.3323	5

According to the above table, manufacturing companies (2.34) were perceived as the most effective source of information in communication information to the cotton growers of the area. This supports the finding of Chandio (1992), who reported that agro-based industries (Sugar Mills) were perceived as most effective source of information for sugar cane growers. Printed material was ranked as the 2nd highly effective source in this field. Agriculture extension was perceived by sample cotton growers as the third top ranking source of information. It was followed by radio (2.8), neighboring farmers 2.98), television (4.12), and press (4.44).

Spraying equipments and their maintenance also require scientific information. Sample growers were therefore asked to rank sources which they believe are effective in communicating information in this regard. Data gathered are presented in Table 7.

Table 7 Means, standard deviations, and ranks for the sources of information regard spraying equipment and its maintenance.

Sr. No.	Source of Information	Mean	S.D.	Rank
1.	Agriculture Extension	1.64	0.9424	1
2.	Manufacturing Companies	2.7	0.7889	4

3.	Television	4.66	0.4785	7
4.	Radio	3.52	0.8861	5
5.	Press (News paper)	4.38	0.9233	6
6.	Printed material (Posters etc)	2.44	0.6439	3
7.	Neighboring Farmers	1.96	0.7814	2

The Table 7 reveals that agriculture extension (1.64) was the most effective source of information. Mallah et al (1987), Sinha (1965) and Inyatullah (1962) also confirmed these findings. Neighboring farmers (1.96) were second most effective source of information. Asghar (1973), Bajwa (1965), Kazi (1984), and Memon (1972) supported the role of neighboring farmers in the light of their findings. Printed material (2.44) was assigned third rank as an effective source of information. Manufacturing companies (2.7), radio(3.52), press (4.38) and television (4.66) as reported by the growers also played a vital role in communicating modern information regarding spraying material and their maintenance.

Mostly pesticides are toxic, and information regarding hazards of pesticides needs to be communicated to the growers. The sample growers were also asked about effectiveness of sources of information which are appropriate for communicating information regarding toxicity and hazards of pesticides. The information pertained is presented in Table 8.

Table 8. Means, standard deviations, and ranks for the sources of information regarding toxicity and hazards of pesticide.

Sr. No.	Source of Information	Mean	S.D.	Rank
1.	Agriculture Extension	2.54	0.9733	3
2.	Manufacturing Companies	2.18	1.024	1
3.	Television	3.72	0.9906	6
4.	Radio	3.5	1.339	5
5.	Press (News papers)	4.45	0.8827	7
6.	Printed material (Posters etc.)	2.34	1.0616	2
7.	Neighboring Farmers	3.28	1.2464	4

Manufacturing companies (2.81) was a highly effective source of information as perceived by the sample growers. This was followed by printed material (2.34); agriculture extension was ranked number three (2.54), an effective source in this regard. Neighboring farmers (3.28), radio (3.5), television (3.72), and press (4.45) according to the respondents did play a significant role in transforming information to the growers.

Because of the toxicity and hazards of pesticides, it is very important that information about safe handling of pesticides be continuously communicated to the cotton farmers. The cotton farmers included in the sample were, therefore, asked to pinpoint the effective sources of information for safe handling. The means, standard deviation, and ranks assigned by the respondents are shown in table 9.

Table 9. Means, standard deviations, and ranks for the sources of information regard safe handling of pesticide.

Sr. No.	Source of Information	Mean	S.D.	Rank
1.	Agriculture Extension	2.34	0.9606	2
2.	Manufacturing Companies	2.28	0.9485	1
3.	Television	3.82	1.0821	6
4.	Radio	3.34	1.0993	5
5.	Press (News papers)	4.46	0.9304	7
6.	Printed material (Posters etc.)	2.58	1.2137	3
7.	Neighboring Farmers	3.3	1.3739	4

Data shown in Table 9. reveals that manufacturing companies (2.28) were the most effective source of information. In a study Chandio (1992), concluded that agro-based industries play vital role in technology transfer to the farmers. Agriculture extension (2.34) followed manufacturing companies and was ranked as the second most highly effective source of information. Printed material (2.58) stood as the third top ranking source of information. Neighboring farmers (3.3), radio (3.34), television (3.82), and press (4.46) also shared responsibility in this regard.

Findings and Conclusion

Results of the study revealed that majority of the respondents (60%) were small farmers having a farm size of 1-12.5 acres and the majority of farmers (56%) were illiterate.

Farmers perceived extension workers as the number one source of information and assigned the highest mean value to this source for pest diagnosis, type of pesticide, and spraying equipment and their maintenance. For the rest of the five pesticide application practices, agriculture extension was ranked either number two or three. Manufacturing companies were perceived by farmers as the best source of information for the best times of pesticide application, spraying techniques and dose calculation, toxicity and hazards of pesticides. Manufacturing companies were ranked number two for pest diagnosis and types of pesticide.

Educational importance

This study compared the different sources of information involved in technology transfer and informal education of the agrarian community of a developing country. On the basis of the findings of the study the agencies included can evaluate and improve their effectiveness in the future.

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LINKAGES BETWEEN AND AMONG RESEARCHERS, EXTENSION PERSONNEL AND FARMERS IN THE NORTH WEST FRONTIER PROVINCE OF PAKISTAN

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Introduction

Although governmental organizations in Pakistan involved in agricultural research and extension, which are responsible for the development and dissemination of agricultural innovations, have common objectives (e.g., an increase in agricultural production and productivity of farmers), the lack of close and effective linkages between them often limits their ability to help farmers effectively and to positively contribute to agricultural and rural development. Lionberger and Gwin (1982), Kelso and Gervais (1983), and Cernea, Coulter and Russell (1985), all stressed the need for effective two-way linkages between agronomic research, agricultural extension and farmers. Studies have indicated that in most countries of the world, researchers tend to be isolated from farmers and extension workers (Clausen, 1984; Kelso and Gervais, 1983; Cernea et al., 1985). Scientists from the research system must have contact with extension personnel and farmers in order to be directly acquainted with production problems, technological requirements, and social, cultural and economic patterns. Similarly, agricultural extension agents have little, if anything, to offer farmers without constant input from the research stations.

Despite this mutual dependence of agricultural extension and research, and the farmer subsystem, in Pakistan, linkages between them are weak, ineffective and often unworkable. Unless three-way linkages are reinforced and sustained between the research, the extension and farmer subsystems, their contribution to national goals is likely to be vitiated, and indeed jeopardized. With this situation in mind a study was designed to investigate the perceptions of researchers, extension personnel and farmers regarding linkages between and among the three groups in Dera Ismail Khan and Bannu Divisions, North West Frontier Province of Pakistan.

Purpose of the Study

This study was designed to provide information regarding existing linkages between and among farmers, researchers and extension personnel of the NWFP Pakistan and the effectiveness of these linkages in disseminating agricultural innovations. The specific objectives were:

1. To determine the existing linkages between and among the three subsystems of agriculture in the two Divisions.
2. To identify the perceived linkage problems in the agricultural system.
3. To describe the effects of linkages on dissemination of agricultural innovations.
4. To determine effective methods of communication between and among the three groups.

Methodology

The descriptive method of research, using questionnaires and interviews was utilized. Survey forms were developed following an extensive review of literature. Information was obtained from the population of 50 researchers and 30 extension personnel and from a sample of 120 farmers, making a study population of 200. Farmers were personally interviewed as most farmers in Pakistan are illiterate. Questionnaires completed by researchers and extension personnel were self administered.

Results

Farmer Interaction With Researchers and Extension Workers.

Results summarized in Table 1 suggest that there were positive linkages among farmers themselves but that few linkages exist between farmers and the other two groups. There was a willingness on the part of farmers, however, to collaborate with researchers and extension workers and reports of some actual collaboration were recorded.

Farmers reported that they should pass their problems to and request advice from both researchers and extension workers but more than 50% of them indicated that they have never done this before with extension agents and about 80% said that they have never participated in the result demonstrations organized by the researchers.

Although they agreed they should, fewer than half of the farmers have requested and used extension workers' advice to improve their agricultural production, and only about 20% of them claimed that they requested and used researchers' advice for improving production. Whereas they indicated that they should not seek help from peers, most farmers (86%) indicated that they have requested and used advice of neighbors. Past studies have shown that most farmers are influenced to change their ways of doing things by a friend or neighbor. So, it is with other farmers that they are likely to become persuaded to try innovations. In addition, dissemination and adoption of innovations take place faster where good personal channels of communication exist.

Extension Agent Interaction With Farmers and Researchers.

Table 2 summarizes the extension agents' perceptions of obligation and frequency of linkages with farmers and researchers.

Extension workers felt that they "should:"

- interpret and transfer to farmers the latest agricultural research findings;
- pass to researchers questions of farmers;
- organize seminars and demonstration sessions to present to farmers the latest research findings;
- use supervisors', farmers', and researchers' advice to improve their programs;
- assist their colleagues in improving quality of their programs; and
- collected agricultural statistical data of their on-farm trials on farmers' fields.

Nevertheless, more than 10% "never:"

- pass to researchers questions arising from farmers;
- assist researchers in obtaining farmers' cooperation;

- interpret agricultural policies.

- And more than 25% never used researchers' or farmers' advice to improve their programs.

- researchers are carrying out their own extension program and bypassing the extension service in the process.

Researcher Interaction With Farmers and Extension Agents.

Table 3 shows the extent of linkages between researchers and extension agents as perceived by researchers. Researchers believed they "should" communicate and interpret the latest research results to extension agents, but 28% claimed they never do. Nearly two thirds also felt they "should" seek help from extension agents to solve research problems, but 70% of them claimed that they never have.

In general, researchers believed that they should be closely linked to extension agents, even though 28% said they never transfer research results to extension workers, 20% never organize meetings to demonstrate research results to extension workers, and 18% never interpret to extension workers the most recent research findings.

On the other hand nearly all researchers indicated that they "should" transfer to farmers the most recent research results (an extension function), and 94% said they "sometimes" or "often" do. Similar findings were noted regarding interpretation of research results and seminars, meetings and demonstrations directly involving farmers, And 70% of the researchers claimed that they "sometimes" or "often" seek suggestions from farmers regarding agricultural problems needing research solutions, but only 50% seek suggestions from extension workers.

Conclusions

According to the researchers, extension workers and farmers of the Dera Ismial Khan and Bannu Divisions:

1. Collaboration among and between the three groups is important for the development and dissemination of agricultural innovations.

2. The extent to which activities are carried out which represent linkages between and among the different groups are perceived differently by members of the different groups. Farmers perceive that they are not receiving enough information from researchers and extension workers, while researchers and extension workers claim that they are disseminating great amount of information to farmers. They also, perceive that they have some contact with each other.

3. There is a great concern regarding the effects of poor linkages among and between the three subsystems of agriculture on development and dissemination of agricultural innovations.

4. Linkages could be improved by integrating the research, and extension education subsystems into one administrative unit.

5. Information about agricultural innovations is most often received through individual contacts, group meetings and mass media, i.e., radio and television.

6. A large proportion of farmers have little or no contact with researchers or extension personnel, and thus are receiving little information regarding agricultural development.

Recommendations

There are two general recommendations which appear to be most readily recognized from the findings and conclusions of this study. One of the recommendations relates to the improvement of the linkages within, between and among the groups studied; and the other relates to additional research which is needed.

Educational Importance

Lack of strong linkages between and among the three subsystems of agriculture is a major problem in agricultural production, particularly in developing countries like Pakistan. More than 60% of its dense and growing population, with low literacy rate and small land holdings, directly depend on agriculture for existence. Researchers, extension personnel, farmers and future farmers may benefit from the results of this study by being more thoroughly informed regarding present and alternative linkages and by using this information to make changes in the ways in which they communicate. The study may promote further research which will assist in making agricultural policy decisions.

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Table 1

Farmers' Perceived Obligation and Frequency of Contact With Extension Workers and Researchers

	Obligation						How often?					
	Should not		Undecided		Should		Often		Sometimes		Never	
Statements	No	%	No	%	No	%	No.	%	No.	%	No.	%
Pass to extension workers problems arising from your farm.	-	-	-	-	120	100.0	24	20.0	32	26.7	64	53.3
Participate in meetings organized by the extension workers.	-	-	-	-	120	100.0	20	16.7	30	25.0	70	58.3
Call on the extension workers anytime a problem arises in your farm.	-	-	-	-	120	100.0	19	15.8	32	26.7	69	57.5
Wait for the extension worker to give you the latest information on agricultural innovations.	114	95.0	-	-	6	5.0	52	43.3	49	40.8	19	15.8
Seek suggestions from extension workers to improve your production.	-	-	-	-	120	100.0	24	20.0	30	25.0	66	55.0
Use the extension worker's advice to improve your production.	-	-	-	-	120	100.0	32	26.7	23	19.2	65	54.2
Seek assistance from extension worker during the sale of agricultural products.	32	26.7	-	-	88	73.6	3	3.5	6	5.0	111	92.5
Request help from your neighbor if you cannot solve a problem arising in your farm.	28	23.3	-	-	92	76.7	82	68.3	22	18.3	16	13.3
Pass to researchers problems arising from your farm.	2	1.7	-	-	118	98.3	2	1.7	17	14.2	101	84.2
Participate in result demonstrations organized by researchers.	-	-	-	-	120	100.0	1	0.8	20	16.7	99	82.5
Participate in meetings held to present the latest research findings.	-	-	1	0.8	119	99.2	2	1.7	19	15.8	99	82.5
Request help from researchers anytime a problem arises in your farm.	1	0.8	3	2.5	116	96.7	1	0.8	16	13.4	103	85.8
Seek suggestions from researchers to improve your production.	-	-	3	2.5	117	97.5	4	3.3	17	14.2	99	82.5
Use researcher's advice to improve your production.	-	-	3	2.5	117	97.5	6	5.0	19	15.8	95	79.2

Table 2

Extension Workers' Perceived Obligation and Frequency of Contact With Farmers and Researchers

	Obligation						How Often?					
	Should not		Undecided		Should		Often		Sometimes		Never	
Statements	No	%	No	%	No	%	No	%	No	%	No	%
Transfer to farmers the most recent research findings.	-	-	-	-	30	100.0	19	63.3	9	30.0	2	6.7
Interpret to farmers the most recent research findings.	-	-	1	3.3	29	96.7	19	63.3	10	33.3	1	3.3
Pass to researchers questions arising from farmers.	-	-	-	-	30	100.0	12	40.0	13	43.3	5	16.7
Assist researchers to obtain cooperation of farmers in field tests.	-	-	-	-	30	100.0	10	33.3	17	56.7	3	10.0
Organize seminars at which researchers present and demonstrate to farmers their latest findings.	-	-	1	3.3	29	96.7	5	16.7	23	76.7	2	6.7
Collect agricultural statistical data.	1	3.3	-	-	29	96.7	21	70.0	4	13.3	5	16.7
Request help from colleagues if you cannot solve the problem.	-	-	-	-	30	100.0	16	53.3	14	46.7	-	-
Interpret agricultural polices to persons in the community.	-	-	1	3.3	29	96.7	17	56.7	9	30.0	4	13.3
Use supervisors' advice to improve your program.	-	-	1	3.3	29	96.7	19	63.3	10	33.3	1	3.3
Use researchers' advice to improve your program.	3	10.0	-	-	27	90.0	3	10.0	19	63.3	8	26.7
Seek farmers' advice to improve your program.	2	6.7	1	3.3	27	90.0	4	13.3	17	56.7	9	30.0
Assist other extension workers in improving the quality of their programs.	-	-	-	-	30	100.0	24	80.0	6	20.0	-	-

Table 3

Researchers' Perceived Obligation and Frequency of Contact With Farmers and Extension Workers

	Obligation						How often?					
	Should not		Undecided		Should		Often		Sometimes		Never	
Statements	No	%	No	%	No	%	No	%	No	%	No	%
Transfer to farmers the most recent research results.	-	-	1	2.0	49	98.0	27	54.0	20	40.0	3	6.0
Transfer to extension workers the most recent research results.	-	-	1	2.0	49	98.0	16	32.0	20	40.0	14	28.0
Interpret to farmers the most recent research results.	-	-	2	4.0	48	96.0	19	38.0	26	52.0	5	10.0
Interpret to extension workers the most recent research results.	-	-	-	-	50	100.0	18	36.0	23	46.0	9	18.0
Organize seminars and meetings to demonstrate to farmers the most recent research results.	-	-	-	-	50	100.0	9	18.0	35	70.0	6	12.0
Organize seminars and meetings to demonstrate to extension workers the most recent research results.	-	-	2	4.0	48	96.0	11	22.0	29	58.0	10	20.0
Organize demonstration sessions on the research station's plots.	1	2.0	1	2.0	48	96.0	9	18.0	36	72.0	5	10.0
Organize demonstration sessions on farmers' plots.	-	-	1	2.0	49	98.0	13	26.0	31	62.0	6	12.0
Request help from colleagues if I cannot solve a research problem.	-	-	-	-	50	100.0	37	74.0	12	24.0	1	2.0
Request help from extension workers if I cannot solve a research problem.	18	36.0	1	2.0	31	62.0	9	18.0	6	12.0	35	70.0
Request help from farmers if I cannot solve a research problem .	16	32.0	1	2.0	33	66.0	6	12.0	20	40.0	24	48.0
Seek suggestions from colleagues to improve my own program.	-	-	-	-	50	100.0	35	70.0	15	30.0	-	-
Seek suggestions from farmers regarding agricultural problems needing research solutions.	8	16.0	3	6.0	39	78.0	8	16.0	27	54.0	15	30.0
Seek suggestions from extension workers regarding agricultural problems needing research solutions.	12	24.0	1	2.0	37	74.0	6	12.0	19	38.0	25	50.0

MAJOR DETERMINANTS OF ADOPTION BEHAVIOUR AMONG COCOA FARMERS IN TRINIDAD AND TOBAGO

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INTRODUCTION

Adoption of technological innovations in agriculture has for many years attracted considerable attention among development economists because the majority of the population of less developed countries (LDC's) derives their livelihood from agricultural production and because new technology seems to offer an opportunity to increase production and income substantially. (Feder et al, 1985).

Within the overriding objective of increasing aggregate output in these countries, a primary goal of agricultural development has been to improve the welfare of rural families through enhancing productivity of small farms. (Merrill-Sands, 1986).

The Technology Applications Gap

With the emphasis on the development of small farm agriculture, many development experts, research scientists, and extensionists remain frustrated by the limited success of their projects. Small farmers frequently reject or only partially adopt "improved" technology. This occurs despite the technology's demonstrated higher levels of productivity in experimental plots, its calculated economic profitability for the farmer, and its beneficial contribution to the larger society. (Merrill-Sands, 1986).

This problem of limited adoption of introduced technologies is described by Merrill-Sands (1986), as the " technology applications gap". Many explanations for the lack of successful technology transfer to small farmers have been advanced in the literature. One school of thought is: "the technology is good, the farmers are at fault". It diagnoses the problem as an attitudinal constraint on the part of small farmers.

The Package Approach

In efforts to increase agricultural productivity, researchers and extensionists in developing countries have typically promoted a technological package consisting of a number of components, such as variety, fertilisers, planting method and weed control. Walker (1981) reports that proponents of the package approach argue that a package is necessary to capture the positive interactions between several components. A package may also provide a convincing effect to farmers by emphasizing the large yield differences between traditional and improved practices.

Horton (1984), reports that, " based on the agronomic principles of input interaction and on a superficial analysis of the "seed-fertiliser revolution " of the 1960's, many development experts and policymakers have concluded that agricultural improvement requires that farmers adopt complex technological packages".

Selective/Stepwise Adoption

Because of capital scarcity and risk considerations, farmers are rarely in a position to adopt complete packages. As an alternative, Byerlee et al (1982), demonstrated that packages can usually be disaggregated into subsets or clusters of one or two components which allow critical interactions to be exploited and which enable adoption to follow a stepwise pattern. They showed that elements initially adopted are those that provide the highest return on capital expenditures.

Ryan et al,(1975), found in the "package of practices" approaches to agricultural development in India, that significant yield and profit increases may still be generated by less radical changes in technology involving minimum costs and minimum risk strategies as a change in the variety of seed used.

Farming System Characteristics

Byerlee et al, (1982) reported that most adoption studies had a "pro-innovation" bias that assumes that the innovation is "right". Therefore they analysed patterns of adoption in terms of different socio-economic characteristics of farmers. According to Rogers (1983), these characteristics (refered to as the "farming system characteristics" in this study) are significant in explaining adoption behaviour only at the knowledge stage in the innovation-decision process model.

Technological Characteristics

Rogers (1983), states that the perceived characteristics of the technology are the key determinants to adoption behaviour at the persuasion stage in the innovation-decision process model. Rogers (1983) found that between 49% and 87% of the variance in the rate of adoption were explained by the perceived attributes of the innovation. Byerlee et al (1982), related the adoption technological components to the characteristics of the technology itself, and demonstrated that farmers followed a stepwise approach to the adoption of a package that reflects the characteristics of each component and the interaction between them. These characteristics are: profitability, riskiness, divisibility, complexity, and availability of necessary inputs. Riskiness is defined here as the chance that the recommendations will fail to give the desired results.

Interaction Effects

Most adoption studies in the past analyzed the relationship between individual variables and adoption behaviour, and ignored possible interaction effects among variables. It is conceivable in any farming environment that several variables interacts with each other to influence farmers adoption behaviour to a particular new technology.

Statement of the Problem

This study examined the adoption behaviour among cocoa farmers in Trinidad and Tobago in response to a technological package introduced more than five years ago for the control of black pod disease.

Black pod disease, caused by the fungus *Phytophthora palmivora* is considered the most important cocoa disease throughout the world. Lass (1984), estimated that this disease accounted for loss of between 20 to 30% of cocoa pods or 300,000 to 450,000 tonnes of cocoa annually. In Costa Rica and Mexico the annual crop loss is 45% and 90% respectively (Lass, 1984). In Trinidad and Tobago, losses can be in excess of 70% annually (Griffith, 1987).

Over 85% of the cocoa farmers in Trinidad and Tobago are small farmers with farms less than 5 ha, producing an average of 100 kg/ha, using mainly traditional farming practices.

PURPOSE OF THE STUDY

The study adopted the Rogers (1983) innovation-decision process model and the theory of Byerlee et al, (1982) and set out to:

(1) investigate the adoption pattern of the package for black pod control,
(2) determine the relationships between (a) the technological characteristics of the package and its components, and levels of adoption, and (b) the farming system characteristics and levels of adoption, and
(3) determine whether the technological characteristics are more important in determining adoption levels than the farming system characteristics.

METHODOLOGY

The technological package representing an integrated approach to the control of black pod disease in cocoa consisted of ten components: regular spraying with fungicides, frequent harvesting and removal of diseased pods, frequent pruning, use of tolerant and high-yielding varieties, adequate drainage, adequate weed control, reduced overhead shade, use of closer spacing, application of fertilisers, and spraying with insecticides (MFPMEFE, 1988).

The study investigates the level of adoption of these components to determine the level of selective adoption among farmers. Literature reviewed showed that farmers tend to selectively adopt components of a package in a stepwise fashion based on various factors. It is conceivable therefore that one would find that between non-adoption and full adoption, there are categories of adoption in a continuum (Figure 1).

0%	34%	68%	100%
Non	Low	Medium	High

Figure 1: Illustrated Statistical Grouping of Adoption Levels Along a Continuum

In order to find the association between levels of adoption and the variables under study, an adoption index was developed. This index assigns a score according to the relative importance of each recommendation in controlling the disease. A score of four points was given for full adoption of each component of the package, and partial scores of between 1 and 3 were awarded for partial adoption. A maximum of 40 points was awarded for full adoption of the overall package, and between 1 and 39 points for partial adoption of the overall package. This adoption behaviour is investigated at a point in time after five years of exposure to the package. Farmers would therefore be at some point along this continuum, representing an average adoption index.

Adopter categories were then assigned based on the percentage adoption score calculated from the adoption index (See Table 1).

Table 1: Percentages and Levels of Adoption of the Adopter Categories

Category	Adoption Level	% Adoption
Non-adopters	0	0
Low adopters	1	1 - 33.99
Medium adopters	2	34 - 76.99
High adopters	3	68 - 100

A survey by questionnaire was conducted among 140 cocoa farmers. the absence of adequate record keeping, reliance was placed on the farmers power of recall.

The technological characteristics investigated were: perceived profitability, riskiness, and complexity, divisibility and availability of necessary inputs.

The farming system characteristics were categorized as (i) personal, such as gender, household size, age, and education, (ii) farm-related, such as farm size and tenancy (iii) situational, such as average yields, and percentage pod loss, and (iv) communicational factors, such as extension personnel visits.

Multiple regression analysis was used to determine relationships between the technological and farming system variables and adoption levels of the components and the overall package, at the 0.05 level of significance. The analyses done were (i) regression analysis, for the continuous technological and farming system variables, (ii) analysis of covariance, for the discrete technological and farming system variables, using dummy variables, and (iii) interaction tests.

RESULTS AND DISCUSSION

Adoption Levels

Table 2 represents a summary of the adoption pattern found for the overall package and its components. The vast majority of respondents were found to be non-adopters of the fungicide (87.8%), close spacing (84.2%), fertiliser (78.4), and insecticide (79.9%) practices. In general, the practices which require major capital outlay were all found to be low-adoption practices.

In contrast, the majority were high adopters of the frequent harvesting (87.8%), pruning (92.8%), and the shade reduction (76.3%) practices. These are generally low cost practices; which can also be considered traditional among most farmers.

Adoption levels were fairly evenly distributed among the other practices. In general, the majority (77.7%) of the respondents were medium adopters of the overall package.

Table 2: Adoption Pattern of the Overall Package for Black Pod Control and its Individual Components

PRACTICES	ADOPTION (%)					
	Non	Low	Medium	High	Score	Level
Fungicide	87.50	-	2.20	10.10	10.07	Low
Harvesting	-	-	12.20	87.80	88.67	High
Pruning	1.40	-	5.80	92.80	95.50	High
Spacing	84.20	14.40	0.70	0.70	4.50	Low
Shade	22.30	-	1.40	76.30	76.98	Medium
Drainage	0.70	51.10	2.20	46.00	55.58	Medium
Fertiliser	78.40	0.70	2.90	18.00	17.09	Low
Weedicide	56.80	-	25.90	17.30	30.22	Low
Variety	9.40	-	41.70	48.90	57.91	Medium
Insecticide	79.90	-	3.60	16.50	16.19	Low
Overall	-	19.40	77.70	2.90	45.27	Medium

The Major Explanatory Variables

The Technological Variables

Table 3 shows that perceived riskiness was by far the most significant variable explaining variance in levels of adoption of almost all the recommended practices of the package.

Contrary to expectations, perceived profitability accounted for very small percentage variances in adoption when compared to perceived riskiness. The perceived riskiness of fungicide use alone accounted for 87.5% of the variance in explaining fungicide adoption levels, while only 0.6% variance was explained by perceived profitability. This is supported by 87% and 99.3% respondents respectively who thought that fungicide use was most risky, and not profitable.

On the other hand, the frequent harvesting and pruning practices were perceived as being quite profitable and least risky by most of the respondents, yet perceived riskiness accounted for higher percentage variances than perceived profitability. These practices are also traditional, low cost practices.

In general, irrespective of level of perceived profitability of most practices, the perceived riskiness accounted for a significantly greater percentage variance in their levels of adoption. The only exception is the close spacing practice where 50.67% of the variance is explained by

Table 3: DISTRIBUTION OF R^2 VALUES OF THE SIGNIFICANT VARIABLES AND INTERACTION EFFECTS IN DETERMINING ADOPTION LEVELS OF THE OVERALL PACKAGE AND ITS COMPONENTS.

VARIABLES	Overall	Fungicide	Harvesting	Pruning	Variety	Drainage	Weedicide	Shade	Spacing	Fertiliser	Insecticide
TECHNOLOGICAL:											
Riskiness	64.10	87.85	8.47	86.48	65.63	63.60	69.74	87.27	0.00	69.03	94.01
Profitability	-	0.59	7.23	-	-	6.79	6.86	6.64	50.67	12.57	-
Complexity	2.18	-	13.17	-	-	-	-	-	-	-	-
Availability	1.15 (Labour)	0.71 (Water)	-	-	1.45 (Trans)	-	0.68 (Weedicide)	-	1.55 (Trans)	0.52 (Labour)	-
Divisibility	-	(95.22)	11.04	-	-	-	-	-	-	3.15	-
Mistblower (Availability)	-	(95.27)									
Sprayer (Availability)			-	-	-	-	(79.58)	-	-	-	-
SUB-TOTAL	67.43	89.15	39.91	86.48	67.08	70.39	77.28	93.91	52.22	85.27	94.01
FARMING SYSTEM:											
Household Size	-	-	-	0.40	-	-	-	-	-	-	-
Age of Trees	1.03	-	-	-	1.03	-	-	-	-	-	-
Pod Loss	-	-	-	0.41	-	-	-	-	-	-	-
Farming Status	-	(97.43)	-	-	-	(73.20)	-	-	-	-	-
Farm Time	-	0.50	-	-	-	-	-	-	-	-	-
Education	-	(91.30)	-	-	-	-	-	-	2.31 (55.87)	-	-
Tenancy	-	(91.87)	-	-	2.46	-	(81.10)	-	(57.22)	(87.66)	-
Major Enterprise	-	(91.39)	-	(90.29)	-	-	-	-	(56.28)	-	0.31 (95.32)
Labour Source	-	(98.43)	-	-	-	-	-	-	4.34 (63.06)	-	-
Credit	-	(96.04)	-	0.46 (95.32)	-	-	-	-	-	-	-
Awareness	-	-	-	(92.23)	-	-	-	-	-	(83.72)	-
Accessibility	-	(96.88)	-	(96.10)	-	-	-	-	(57.09)	1.74 (90.79)	0.27 (95.14)
Know. Extension Officer	-	-	-	0.36 (90.99)	-	-	-	-	-	-	-
TOTAL	68.46	89.65	39.91	88.11	70.57	70.39	77.28	93.91	58.87	87.01	94.59

Figures in parenthesis represents R^2 values showing significant interaction effects with the continuous variables, at 0.05 level of significance.

perceived profitability. This is supported by the fact that adoption of this practice requires a change from the traditional intercropping system with bananas and citrus, which provides supplementary income, to one of pure stand cocoa only.

Since the majority of respondents were full-time farmers, with less than 5 ha of cocoa, it can be concluded that farmers consider the probable risk involved in adopting a practice to be more critical to the success of their farms, and by extension, their livelihood, than the returns to be generated. This is supported by Walker (1981) who concluded that, "... poor farmers in developing countries are associated with a reluctance to take risks, presumably because risk-taking would jeopardize their subsistence". He further claimed that, "... low income farmers will not change their more stable, lower-return traditional techniques for riskier, more profitable practices and varieties".

Byerlee et al (1982), also found riskiness to be a major determinant of adoption in that adoption would be slower if it increases risk.

The perceived complexity, divisibility and the availability of inputs were also found to be significant explanatory variables in determining adoption levels of many of the other variables. These variances were however quite small when compared to perceived riskiness and profitability (Table 3).

Together, these technological variables accounted for between 39.91% to 94.01% of the variances in adoption levels of the ten components of the package and 67.43% of the overall package (Table 3).

The Farming System Variables

A few of these variables showed only minor significance in determining adoption levels in the presence of the technological variables. The highest percentage variance (4.34%) was shown by the variable, major labour source, in determining close spacing adoption levels (Table 3).

The importance of the socio-economic and other personal characteristics in influencing adoption in previous research is not supported in this study. Variables such as age of the farmer,(at an average of 58 years), farming experience, average yield, and income were not significant in determining adoption levels of any of the components.

Interaction Effects

It is interesting to note that significant interaction effects were however found between several farming system variables and technological variables in determining adoption levels of several components (Table 3).

The divisibility of a practice showed fairly high significance in determining adoption levels of five practices, but only in interaction with the significant continuous variables. The degree to which these practices can be experimented with on a limited scale may also be seen as a risk aversion character.

Variables such as farming status, educational level, labour source and major enterprise which were not significant in determining fungicide adoption levels, showed significant interaction effects with the technological variables for fungicide adoption.

EDUCATIONAL IMPORTANCE

The findings of this study suggest that researchers and extensionists should focus more on examining the characteristics of the technology they recommend to small farmers than on "farmer characteristics".

However, the notion that variables interact with each other to determine adoption levels as clearly supported in the study, should also be taken into consideration.

Ex ante analyses seems imperative therefore to test these characteristics within the dynamics of the farmers environment.

The fact that the farmers rationally selected components to adopt at specific levels, suggest the need for subsets of packages that allow for a gradual process of adoption of the entire package in the long run.

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Session D EXPERIENTIAL LEARNING APPROACHES

1. **Extension Staff Development Program: A Focus on In-service Training for Agricultural Trainers in Designing Experiential Courses**
   Thomas Trail
   Grace Margaret Malindi

2. **Learning Styles of Extension Personnel and the Implications for Designing Inservice Computer Training Programs**
   Sung-Youl Park
   Julia Gamon

3. **Linking Vocational Agriculture to Labor Market Needs: Lessons from Swaziland Agricultural Educators**
   Comfort B. Mndebele
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4. **Field Attachment Programs as Perceived by Students, Lecturers, and Employers in Swaziland**
   B. M. Dlamini
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   X. P. Gobin

EXTENSION STAFF DEVELOPMENT PROGRAM: A FOCUS ON IN-SERVICE TRAINING FOR AGRICULTURAL TRAINERS IN DESIGNING EXPERIENTIAL COURSES.

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Introduction

Globally, "creative, well- trained, highly motivated leaders in the biological and social agricultural sciences are essential for agricultural development to proceed" (FAO 1984, p.14). Malawi's Ministry of Agriculture is no exception in following the same strategy of developing well- trained staff in order to improve agriculture, which is the main stay to the country's economic development. The Ministry of Agriculture (MOA) needs well- managed and systematic strategies in order to support the government's policy which emphasizes an increase in small-holder agricultural production.

Professionalization of the Agricultural Training Service through the Agricultural Training of Trainers (ATOT) program has been one of the crucial strategies in the achievement of the MOA's overall goals. Under the ATOT program, efforts are underway to develop good quality trainers who are responsible for training agricultural field extension staff. The Ministry of Agriculture adopted the **Kolb's experiential learning model**, for training both farmers and staff. Although there are success stories on staff development, through the Agricultural Training of Trainers program, as reported by the Malawi Agricultural Research Extension project (MARE) mid-term evaluation team (1990), there is still a need to verify the areas that need to be improved in designing experiential courses. Therefore, this study is a reflective observation on designing experiential courses by Divisional agricultural process/content trainers.

Given support from the Ministry of Agriculture and USAID mission to mount a Reflective Observation workshop, a participatory/action type of research was done in anticipation of contributing to the Agricultural Training Branch data base for future staff development courses. In order to maximize the workshop participants' contribution, self- assessment and evaluation instruments were used. Participants were expected to express their level of competency and training needs in designing experiential courses and areas that needed to be improved on the presently used model for designing experiential courses Model Framework for Course Planning (MFCP). A background is necessary in order to put this study into context.

Background

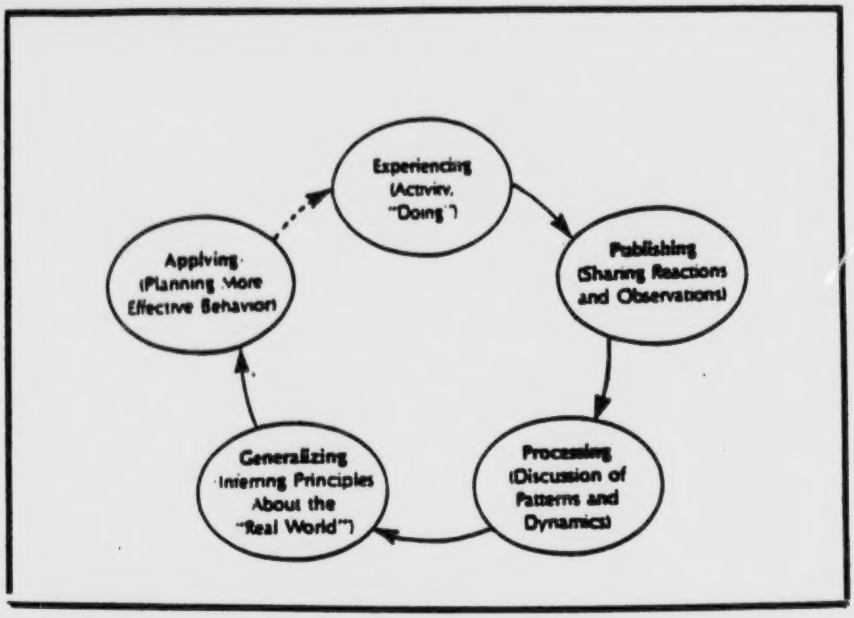
Malawi is a small country located in Central Africa with a population of ten million and a high population/land density. The country mostly depends on agricultural production for its economy. With limited export potential, there is great pressure on the Government of Malawi to devise an agricultural development policy which will allow self sufficiency in food; Malawi has to produce enough food to feed her population and prevent further deterioration in per capita food supply.

The Ministry of Agriculture (MOA) within the Government of Malawi is responsible for implementing government policy and providing assistance to the farmers at grass roots level. In order to fulfill this mission, under the present organization, the MOA is divided into five departments, namely: Department of Research, Department of Agricultural Services, Department of Animal Health and Industry, Planning Division, General Administration and Personnel. At field management level, the country is divided into eight Agricultural Development Divisions (ADDs). Each ADD has two to five Rural Development Projects (RDPs) which are headed by Project officers. Each RDP administers two to five Extension Planning Areas (EPAs) headed by a Development officer who has five to ten field Extension workers composed of Field Assistants and Farm Home Assistants, working under him. Each field assistant has 500 to 700 farm families he/she serves. An EPA is subdivided into sections and sub divisions of extension blocks of farmer contact groups which are for facilitating message and input delivery. Each RDP has two to six day training centers, one to two residential training centers and a few have Farm institutes. This study focuses on divisional level staff. MOA requires highly trained, competent people. But, since Malawi has been independent only since 1964, university trained personnel are scarce and not available at all levels of MOA responsibility. Thus, further training of many staff members is required on the job. How can this best be undertaken, given limited resources and high transportation costs? This research attempts to address this question, concentrating on the training of trainers (persons who will train others at both middle and lowest level ranks).

In view of the described organizational structure, Nellum 1982, reports that "Malawi has an extensive and comprehensive organizational structure for assisting agricultural smallholder sector, but the "extension and training staff are not sufficiently trained to perform their jobs competently " (p.23). Similar studies also showed that "individual staff both men and women were found to be alert, energetic, interested in their programs but were not well informed and could only articulate within the limits of their training experience "(Macdonalds and Associates, p.12 1986). The studies also revealed that pre-service training for extension and training needs to be brought in line with the policies and operations of the Ministry of Agriculture. In-service training for extension and training staff was found to be far from satisfactory especially on delivery methods and management of training. This was particularly true for staff occupying positions at the Agricultural Development Divisions (ADD) headquarters including Training officers, subject matter specialists and project officers, collectively classified, as middle level Extension and Training management staff. Therefore, the problem under this study, is that, there are deficiencies in in-service training provided to agricultural trainers particularly in designing experiential courses.

In order to improve the training capacity for the Agricultural trainers, the Kolb's experiential learning cycle model was adopted as a training strategy to be used for agricultural staff as well as farmers in 1987. Kolb's four stages of learning which are useful in designing learning opportunities, courses and instructional units, include: reflection on the concrete experience of life with other adults, development of abstract concepts on the learnings, generalizations on the learnings and what can be applied from various learnings. Figure 1 shows the phases of the experiential learning model. Each phase of the learning cycle is justified according to four different capabilities an effective learner requires. The four capabilities which relate to the four main phases within the experiential cycle are: concrete experience skills, reflective observation skills, abstract conceptualization skills, and active experimentation skills (Kolb,1984). Thus within the cycle, immediate concrete experience is the basis for observation and reflection. The observations are assimilated into an idea or theory from which new implications for action can be deduced. The implications serve as guides in creating new experiences.

Figure 1. **The Experiential Learning Cycle**


Experiencing (Activity, "Doing")
Publishing (Sharing Reactions and Observations)
Processing (Discussion of Patterns and Dynamics)
Generalizing (Inferring Principles About the "Real World")
Applying (Planning More Effective Behavior)

(Source: Pfeiffer J. and Ballew C., 1988)

Several studies reveal how strong the model is, particularly in training adults. Experiential learning techniques have grown rapidly in number and acceptance in the last twenty-five years(Menson (1982). Compared to traditional learning process, experiential methods help to strengthen the bond between the learner and what is being learned by encouraging reflection on the meaning of abstract concepts in light of shared personal experiences. It also encourages learner's responsibility and ownership towards their learnings. With the reflection and sharing of experiences, experiential methods allow more of two way communication than the one way as in the traditional methods (Lewis (1986).

Why is designing of experiential courses the focus of this study? The emphasis on the designing component is crucial because designing is a compound and complex competency which trainers have to inevitably deal with in implementing training programs. In addition to this justification, experiential opportunities require extensive skills in order to designing in order to manage the experiential learning process. Hence the need to investigate what needs to be improved in designing experiential courses before the model is used to train the primary target, the small-holder farm families. The only and most recent formal study on experiential courses was on the ATOT program within the Ministry of Agriculture, done by the mid-term evaluation team of the Malawi Agricultural Research and Extension project, CID/USDA personnel. Findings of the study were:

> The Experiential Learning Cycle (ELC) concept has been adapted intelligently to local needs and is implemented in a nondoctrinaire way consistent with the local culture. Trainees are given enough basic understanding to be able to make their own adaptations, and the trainees observed from the national level, Agricultural Training of Trainers (ATOT) training appeared to be excellent...Tutors at the Natural Resources College have also used the approach. They found that it requires more time than traditional methods to cover the same technical topics, but that students are better able to use the ELC approach in making informal presentations at meetings and report enthusiastic responses.(Anonymous, 1990, p.31)

It was also reported that the ministry's "Administration staff support the ATOT concept and believes that it will be sustainable with a few modifications if it is tied closely to local program priorities" (Mid-term evaluation report, 1990, p.31). Although the above findings are crucial to the ongoing ATOT program,they did not provide specific data on the level of capability by category of trainers as well as required specific competencies in designing experiential courses. Also the specific areas that administrators required to be modified in order to make the ATOT program sustainable need to be spelled out.

Purpose of Study

Therefore, it is in the interest of this study to reveal required competencies in designing experiential courses. Although the trainers may be competent enough to design experiential courses, if the system or the model used in designing is deficient, it may deter effective and efficient designing of experiential courses. Therefore, this study also investigated what needs to be modified on the presently used model in designing experiential courses, the Model Framework for Course Planning (MFCP). Specific research questions were:

1. According to alternative design models revealed in literature, what steps and tasks are involved in designing experiential courses?
2. What needs to be improved on the presently used MFCP Model in designing experiential courses?
3. What competencies do content/process trainers require in order to design experiential courses? Are there any significant differences between the two categories of trainers in their identified and prioritized in-service training needs?
4. What implications do the research findings have on the Ministry of Agriculture's policy?

Thus, this study examined agricultural trainers (content/process) at the divisional(operational) level. Within MOA, content trainers are considered to be specialists dealing with their respective subject matter or areas of specialty, whereas process trainers are considered as a core group of trainers who are responsible for training other trainers in training and communications methodologies based on adult learning principles.

Methodology

While this study is mainly considered descriptive, it can also qualify as action research because it attempted to "provide immediate answers to problems that cannot wait for theoretical solutions" (Gay, 1987,p.9). This study mainly used a triangulation of observational and survey research methods in order to investigate the response of content and process agricultural trainers on required competencies and improvements in designing experiential courses. The observation approach allowed focusing on trainers in their natural settings. Besides, this study deals with people (trainers) as one of the variables, thus the likely prevalence of numerous variables which are better revealed through observation. The workshop as a treatment was necessary in order to prepare the trainers to critique the present model of designing experiential courses so that they can contribute to ways of enriching it as well as to determine specific areas in which they need to improve their competencies.

Touliatos and Compton, (1988) and Bailey (1987), provided the research methodological guidelines used in this study. Long and Allen, (1987) provided interactive data gathering techniques. The dependent variable framework is adopted from Boyle,(1986), Farmer and West,(1989), Kolb, (1984) and Knowles, (1980).

Data collection

The primary source of data in this study was from a one - week " Reflective Observation" workshop for 24 Agricultural process and content trainers. Interactive, self-assessment and group techniques were used in order to respond to the same questionnaires used during the surveys. Structured observation was used through the entire one week workshop, aided by video recordings and an observation guide sheet. Out of the 24 invited participants, 21 attended the workshop, with 87.5% rate of response.

The secondary data were from the ATB documents indicated in the literature review, questionnaire surveys administered, using group interactive techniques, to the process and content trainers. Another questionnare was administered to the supervisors for the agricultural trainers, who are the Program Managers for the eight Agricultural Development Divisions(ADDs). Informal observations during field visits add to the secondary data while formal observations, made during the workshop, add to the primary source of data.

For each ADD, nine questionnaires were issued to the ADD's Training Officers, as research assistants, in order to be administered to three process trainers, three content trainers, and three mixed group of process/content trainers who had not attended any Agricultural Training of Trainers course. This latter group was therefore loosely used as a control (the untreated group). Each training officer was given an orientation session on background of the research, ethics and procedures to be used in administering the questionnaire for more reliability on the research procedures. The trainers responded to the questionnaires in a classroom situation and each training officer administering the questionnaire had to give an interactive lecturette on how to respond to the questionnaire as well as providing guidance in the process of completing the questionnaires. There were 68 questionnaires completed for a final return of 94.4%.

Five out of eight program managers were interviewed. A guided interview by the use of a questionnaire was used to collect from the program managers. During field visits informal observations were done at Liwonde and Blantyre ADDs because they were the only ADDs conducting the Agricultural Training of Trainer's course to divisional trainers during the period of investigation.

Population and Sample size

The target population was deliberately restricted to a group of trainers who have undergone the experiential type of courses through the ATOT program. Hence, the use of purposive sampling. This study used the quota type of purposive sampling to ensure studying individuals from desired categories. From a total of 330 trainers who have gone through ATOT, 48 trainers were selected to be observed. Three more trainers who have never attended any ATOT courses were selected from each ADD as a control group. Within the 24 trainers who were not exposed to ATOT courses, the two categories of process and content trainers were represented.

Instrumentation

Two types of questionnaires and an observation check list were developed based on the Dillman (1978) and Raab et al. (1987) questionnaire designs. Modifications on the questionnaires were made based on the review comments by two faculty members in the College of Agriculture and fellow graduate students in Extension Education for final construction. One of the questionnaires was for the ADD administrators (secondary questionnaire (SQ) and the other for the trainers (primary questionnaire(PQ)). The observation check list (OB) was used for the structured observations during the workshop, aided by video recordings.

Analysis of data

A Statistical Analysis System (SAS) software package was used to analyze some of the data collected from the 22 trainers who attended the Reflective Observation Workshop and the 68 questionnaire survey respondents. Frequencies and means were used to describe the data. A T-test on the open-ended question and the repeated measure ANOVA on the pre-test and post-test were done for further analysis and interpretation. Qualitative data from literature reviewed, training records, program administrators questionnaires, discussions and interviews were compiled using concrete categories.

Results and Conclusions

The results follow the order of three main research questions for this study.

Results and conclusions for question 1:

From the literature reviewed, various models showed six common steps in sequence and re-occurrence which include: **Situation Analysis, Goal and Objective Setting, Content Establishment, Methods and Material Selection,**

Training Activities and Instruction, and Evaluation. The differences on the tasks under each step imply variation in the design models. The presently used Model Framework for Course Planning (MFCP) had 11 steps, including the discovered six common steps. Therefore, the MFCP steps were fused to six steps with distinct tasks for each step rendering it easier and useful for critical analysis during the investigations. The rest of the steps were added to the tasks under each step. Figure 2 appendix 1 shows a summary of the design steps accompanied by tasks for fulfilling each step. Alongside the fused MFCP steps is the recommended task indicator framework for experiential training designs. The six steps and tasks also served as dependant variable framework for measuring and determining competencies required by trainers in designing experiential courses.

Results and conclusions for question 2:

Findings under the MFCP improvements include:

(i) Survey Input on MFCP Improvement

Sixty-six percent of the respondents indicated they did not have any suggestions for MFCP improvement unless they were more exposed to MFCP as well as other alternative design models. However, there was input mostly from process trainers on steps 5 (Training Activities and Instruction) and 6(Evaluation). The steps need to be elaborated into tasks in order to provide adequate guidance on carrying out each step.

(ii) Attitudes on use of MFCP

Both the process and content trainers indicated that MFCP was helpful at keeping them on task and following the steps without confusions but found the paper work frustrating and time consuming. Comments from process trainers field surveys indicated that experiential course designs allow systematic and logical way of presenting content. The design principles have also worked when applied in conducting meetings. Experiential designs have great potential for being accepted for farmer training besides the acceptability already shown by staff. Comments from content trainers indicated satisfaction with two-way communication and had hope that it would work on farmenr training.

(iii) Workshop Input on MFCP Improvement

The workshop participants suggested modifications on the following:

1. The title, "Model Framework for Course Planning" to **"Model Framework for Course Design and Planning"(MFCDP)** The new title was meant to emphasize the importance of the design component in developing courses. There was also an addition of one more step- situation analysis, changing the number of steps from 10 to 11. All the steps indicated tasks required to achieve the step. Appendix I show more details on the tasks required under each step and modified task indicator framework is shown alongside the fused MFCP steps.

The fact that the trainers could not satisfactorily contribute to the MFCP improvement entails inadequate in-service training to make the trainers proficient in designing experiential courses. From the general trainers' attitudes and administrators' comments, it can be concluded that the presently used MFCP is helpful in designing experiential courses but still needs modifications for more efficiency, particularly to avoid trainers' frustration from excessive paper work which takes time needed for other field work.

Results and Conclusions for question 3:

This part is in response to trainers' required competencies in designing experiential courses. Overall trainers' performance on designing experiential courses based on Open-ended Question(OPQ) pre-test and post-test results was generally very low, with mean scores of 2.48 for process trainers, and 2.24 for content trainers, out of 12 total scores. From the means there were no significant differences between the two categories of trainers in their low performance implying a general need for both categories of trainers to improve their competencies in designing experiential courses.

Table 1. OPQ Results for the Treated and Untreated Groups of Trainers

Source	df	Mean	Probability	Duncan Grouping
Treated group (Process/Content)	51	2.75	0.0041	A
Untreated group (Process/Content)	14	0.78		B

According to the Duncan's mean grouping analysis, the difference in performance between the treated and untreated groups within the categories of trainers is significant, implying an urgent need to develop the untreated group through in-service training.

The general need to improve the trainers' competencies is further confirmed by a closer observation of the trainers from the workshop pre-test and post results and the observation comments. On the pre-test process trainers performed higher, by one point mean score, than the content trainers. The difference may be due to the previous treatments through ATOT and the higher number of the process trainers attending short courses pertaining to ATOT. Both categories of trainers revealed high performance on the post-test. Although there was a slight drop in the process group performance, this may be due to the 23% of the trainers who deliberately omitted the step on situation analysis assuming MOA was responsible. The insignificant difference in performance at post-test implies that the workshop managed to develop the trainers to a common understanding on experiential course designing. However, there was significant difference in trainers' performance between the pre-test and post-test. The difference implies the magnitude of in-service training efforts on required competencies. If there is such a difference between the tests on the treated group of trainers, it means more in-service training efforts for the untreated trainers' group. At the same time the results confirm a general positive effect of the ATOT program at improving trainers' capabilities.

The same trend on observation comments from the OPQ and the pre-test indicated that some of the content trainers listed a breakdown of subject matter topics instead of design steps, and some of the process trainers emphasized logistic and administrative arrangements. This tendency in the trainers confirms the general need for the trainers to improve their competencies in designing experiential courses. Observations such as: trainers giving a good focus to the first few steps, omission of situation analysis and most of the tasks under each step lead to specific areas trainers need in order to improve designing experiential courses.

Table 2. The workshop group opinion results Table 2 shows trainers' response on specific areas trainers need to improve their competencies in designing experiential courses. The following are prioritized areas for experiential design improvements, by category of trainers. The priorities areas are shown by number of asterisks. Three asterisks stand for first priority. Two asterisks stand for second priority and, one asterisks stand for the third priority.

Content trainers need to improve on:	**Process trainers need to improve on:**
*** Step 1(situation analysis)	*** Step 6 (evaluation), tasks requiring training are: a variety of evaluation techniques, developing evaluation instruments, data analysis and interpretation and utilizing evaluation results.
*** Step 6 (evaluation)	*** Step 1 (situation analysis), required tasks for training are: use of techniques and devices assessing individual needs and needs assessment report writing.
** Step 5 (training activities/instruction)	** Step 4 (methods and materials); tasks requiring training are: creative use of a variety of methods and use of locally available materials.
** Step 4 (Methods and Materials)	** Step 5 (training activities/instruction); the tasks needing training are: timing and sequencing of activities.
* Step 3 (Content development)	** Step 3(content development); they still need to improve on developing and using role plays and case studies.
* Step 2 (Goal setting)	* Step 2 (goal setting); trainers need to improve on statement of objectives in view of various factors such as content, macro-objectives and the overall situation analysis.

Content trainers will require emphasis on all tasks under each of the indicated steps needing improvement.

Workshop observation comments

The workshop participants' reaction to the self-assessment exercise on required competencies for designing experiential courses was summarized as follows: In general both process and content trainers were observed to be frustrated by the difficulties they had in compromising the self-ratings on the design steps. Both categories of trainers also found the exercise on self-assessment to be tedious and time consuming but were pleased with the thorough analysis of their competencies. They expressed no confidence in carrying out most of the tasks under each step but they found all the steps to be important in designing experiential courses.

Significant dissappointment was observed from content trainers for not being given enough opportunities to review and practice the design steps. They looked apprehensive with the idea of designing a total course on their own and were also uncomfortable in implementing most of the tasks under each design step, particularly situation analysis and evaluation. Content trainers revealed their guilt in overrating their competencies, and they considered themselves to be average in most of the design tasks. The process trainers were initially observed to be resistant to accept responsibility of implementing step 1 (situation analysis) with the belief that the ATB would continue to do it for all the trainers. They were, however, slightly reluctant at the slow weaning process of being independent in designing experiential courses on their own. The process trainers also indicated difficulties and lack of confidence in carrying out some of the tasks particularly those under evaluation, needs assessment and phrasing objective statements. However, they found all steps important and felt they should be proficient in all the tasks under each step.

Results and Conclusions for Question 4

Generally, the training programs using experiential designs have been favorably accepted by trainers and their administrators. The respondents indicated that there is potential acceptance of the experiential designs when also applied to farmer training. However, there is still a need to improve the design model accompanied by trainer's competencies in implementing the total model within the context of the entire system of MOA's operation. This implies the need for MOA to reconsider and restructure in-service training strategies and re-stating staff training priorities in view of the recommendations based on this study.

Educational Importance and Recommendations

☐ Improvements on trainers' competencies in designing experiential courses

The results of this study should mainly be made available to MOA's Training Branch baseline data for programming in-service courses and, where necessary, external training related to designing experiential learning opportunities. According to the results of this study, it is specifically recommended that the two categories of trainers, process and content, receive appropriate in-service training in their respective identified and prioritized areas. There is an urgent need to provide in-service training for trainers who have never been covered through the ATOT program in order to ensure uniform standards in professionalizing the training service. It is important that in-service training provided to all staff should be provided according to type of trainers, their function, responsibility, roles and prioritized job competencies. It is also essential to have a thorough task analysis of the recommended experiential design model in order to determine which competencies need to be given attention during in-service training.

☐ Improvements on the presently used design model: The MFCP.

There is a mutual relationship between an improved design model and improving trainers' competencies in designing experiential courses. The more efficient the design model is, the easier and practical it is to develop staff to implement the model. The recommendation on the MFCP title modification to Experiential Course Designing and Planning Model(ECDPM) is important because of the significance in the art of designing experiential courses within the experiential context. The reduction of 11 design steps to six steps is for simplicity, practicality and efficiency purposes. The rest of the steps were converted to tasks under each step. The **Task Indicator framework is shown in Appendix 1, Figure 2.** The ECDPM also shows revised and additional tasks for each step . The accompanying instructions for each step have been separated from the tasks for better focus on the required procedures and task analysis. Before recommending the EFCDP for use in the field, it has to be pilot-tested in two or more Agricultural Development Divisions.

☐ Future directions for research

The results should be distributed to other agricultural institutions such as Bunda and Natural Resources Colleges for reference and further research; and to all those who participated in this study for their information and suggestions for further improvements. It is recommended that the design framework with required steps and tasks be constantly revised based on recent research findings and literature and to expose and update all trainers to current literature and findings on alternative design models in order to increase the trainer's competency confidence and independence in working on their own experiential designs. The opportunity would also increase trainers' continuous input in improving experiential design models in addition to the motivation and capability to participate in conducting required research on experiential type of training. It is recommended that research continue on improving design models and competencies in order to keep up with the everyday technological and policy changes. The following areas are recommended for future research as this study could not focus on everything related to designing experiential training opportunities.

- An analysis of the two categories of trainers' (content and process) roles, functions, responsibilities (job -task analysis) for determining areas of focus during in-service training.
- Optimum experiential design models for a)staff training and b) farmer training.
- Effects of experiential designs on staff/farmer training.

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Appendix 1

Figure 2. A Comparison of Task Indicators between the Fused Model Framework for Course Planning(MFCP) and Experiential Course Designing and Planning Model (ECDPM)

STEPS	FRAMEWORK FOR DESIGN STEPS (A FUSED MFCP)	TASK INDICATOR FRAMEWORK FOR EXPERIENTIAL TRAINING DESIGN
STEP 1 SITUATION ANALYSIS	TASKS: • Determining needs and interest of participants • Identifying overall training needs • Using a variety of techniques, devices and sources for training needs identification • Assessment of results for identifying: a) common group needs and b) individual needs.	TASKS: * Policy considerations, predesign considerations the "seven What & How questions", * identification of other program driving factors at both national and grassroots levels, * formulation of a training hypothesis, * designing and developing a needs assessment instruments, * use of various needs assessment techniques and devices, * designing needs assessment for a group, * designing needs assessment for an individual, * data collection techniques, data analysis and interpretations, * report writing, * utilization of results and * decision to train.
STEP 2 GOAL AND OBJECTIVE SETTING	TASKS: • Developing overall goals • Developing specific objectives.	TASKS: * Identification of types of learning, * develop overall training goals, * identification of types of learners, designing meaningful objectives, * wording objectives realistically, * In relation to the specific objectives revision of pre-design considerations eg. administrative, logistic and technical re-arrangements.

Appendix 1

Figure 2. A Comparison of Task Indicators between the Fused Model Framework for Course Planning(MFCP) and Experiential Course Designing and Planning Model (ECDPM)

STEP 3 CONTENT DESIGN AND DEVELOPMENT	**TASKS:** · Selection of training content · Developing training content.	**TASKS:** * Identification of content domains in relation to learning objectives, * selection and prioritizing learning content, * structuring content in relation to learning objectives as a pre-requisite to procedural, module and course designs.
STEP 4 LEARNING STRATEGIES AND UTILIZATION OF DESIGN COMPONENTS	**TASKS:** · Selecting methods of training · Selecting training materials.	**TASKS:** * Selection of learning activities/experiences considering learner involvement, types of learning, learning strategies and training content, * structuring and sequencing learning experiences to yield; procedural, module and overall courses designs, * timing of events considering orienting, relating actual doing and transitioning factors, * grouping topics/procedures/modules and overall course according to available time, * structuring learning activities in experiential learning cycle (ELC) format ie.: - techniques that facilitate the experiencing,processing, publishing, generalizing and application phases, * structuring learning activities that are balanced, varied, less difficult to difficult and familiar to less familiar, * selecting training devices (media), * developing training materials and setting devices, and * modifying designs.

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Appendix 1

Figure 2. A Comparison of Task Indicators between the Fused Model Framework for Course Planning(MFCP) and Experiential Course Designing and Planning Model (ECDPM)

STEP 5 CONDUCTING TRAINING	TASKS: • Develop and design an experiential procedure/instruction • Develop and design an experiential module • Develop and design an experiential course • Appropriate selection of activities for experiential procedures, modules and courses • Sequencing training activities/scheduling activities.	TASKS: * Presentation skills in ELC format, * facilitating skills, * being sensitive to participants' responses, * communication skills, * collaborating with other trainers/ co-facilitation skills. * timing, pacing and sequencing of learning activities in terms of 1) orienting activities which include: climate setting ice breakers and energizer; 2) relating activities which include getting acquainted, establishing learning expectations of learnings, building trust and norms and energizers; 3) doing involves learning actives meant for achieving learning objectives and core content eg. lecturrettes, group discussions, role-plays and any other appropriate design components; 4) transitioning involves techniques for reinforcement and support in applying new learnings, new skills and practicing new behaviors.
STEP 6 EVALUATION	TASKS: • Developing and adopting existing data collection instruments • Administering instruments for assessing student's performance on: - skills, - attitudes, - knowledge • Interpreting results • Utilisation of results for further plans.	TASKS: * Determining who should do the evaluation, * selecting appropriate type of evaluation, * developing evaluation instruments, * conducting various types of evaluation methods, * analysing and interpreting and utilizing results.

Learning Styles of Extension Personnel and the Implications for Designing Inservice Computer Training Programs

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Almost eight decades have passed since the 1914 legislation by the U.S. Congress that mandated Extension to diffuse "useful and practical information . . . on agriculture and home economics." Extension continues to educate people to deal with their problems and to help them make appropriate decisions based on scientific and applied knowledge. However, the teaching methods and communicating approaches Extension adopted in the past need to be updated for today's diverse and quickly changing society in the information age (FACT Committee, 1991). Extension needs to put more effort toward computerizing its system and toward increasing the computer literacy of its personnel (Taylor et al., 1991).

Information on the preferred learning styles of Extension personnel would help in the design and implementation of computer training and support programs. A learning style is the unique way each individual deals with information during the teaching/learning process. Using information on diverse learning styles is a relatively new consideration in the design of training programs. Even though educators in the past decade have focused a lot of attention on learning styles of students, the attention has been mainly on school settings. Very little attention has been paid to Extension settings, and there has been little research done on the learning styles of Extension personnel. Yet every Extension service has its own inservice training program to keep its personnel updated with new scientific technology, and by understanding individuals' learning styles and taking them into account in designing computer training programs, a greater learning effect could be achieved.

Purpose

The primary purpose of this study was to identify and describe the learning styles of Iowa State University Extension Service personnel. A specific objective was to investigate relationships between learning styles and opinions toward computer inservice training and support. The question was as follows: Are there significant differences in opinions toward training and support when personnel are grouped by learning styles?

Theoretical Framework

Learning styles were defined as characteristic cognitive, affective and physiological behaviors that serve as relatively stable indicators of how students perceive, interact with, and respond to the learning environment (Keefe, 1988, p. 3). Kolb's (1984) experiential learning theory was used as a basis for the learning styles assessed in this study. He maintained that learning consists of a four-stage cycle. The four-stage cycle includes the following modes: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). Specific learning-style types are calculated by combining the AC-CE and AE-RO scores. Based on AC-CE and AE-RO scores, one's specific learning style is determined to be one of the following four different learning styles: converger, diverger, assimilator, and accommodator.

The converger learning style combines the learning steps of abstract conceptualization (AC) and active experimentation (AE). Persons with this learning style are interested in finding practical uses for ideas and theories to solve specific problems and to make decisions based on finding solutions to questions or problems. Converger learners tend to be in technological careers. The diverger learning style emphasizes concrete experience (CE) and reflective observation (RO). Persons who learn in this style are best at viewing concrete situations from various perspectives. Diverger learners tend to work in the arts, entertainment and service realms. The assimilator learning style employs abstract conceptualization (AC) and reflective observation (RO). Persons with this learning style are best at inductive reasoning and theory construction; they are able to assimilate observations into an integrated and local framework. Persons with this learning style are most likely to do well in information and science careers.

Methodology

Population and Sample. The population for this study was composed of all Extension personnel listed in the 1992 Iowa State University Extension Directory. This included administrators, support staff, state specialists, field agents, paraprofessionals, and office assistants. It included personnel from Continuing Education, and Extension to Business and Industry as well as Cooperative Extension. The total population numbered 974 and a sample of 200 was randomly selected to receive the mailed questionnaire in the fall of 1993. Two follow-up mailings were made, and the final response rate was 95 percent. Late responders were compared to early responders, and no significant differences were found. Because of the high return rate and rate of differences between early and late responders, no further effort was made to contact non-respondents.

Instrumentation. Kolb's Learning Style Inventory (LSI) was used to assess learning styles. Kolb's LSI has a well-developed theoretical foundation, and may be the most widely used learning style inventory (Carricato, 1983; McCall, 1984).

The LSI is a twelve-row-sentence questionnaire. Each sentence has four endings and respondents are asked to rank order (from 4 to 1) in terms of how they would go about learning something. The four columns correspond to the four stages in the learning cycle (Kolb, 1985).

Opinions toward computer training and support were surveyed by an instrument developed by the researchers and pilot-tested for validity and reliability. It consisted of 17 questions and used a Likert-type scale. Content validity of the instrument was established by review by three Extension computer specialists and by members of the researcher's graduate committee. The reliability was established by pilot-testing the instrument with 25 persons not included in the study. Reliability of the section on computer training and support was .84. All of the sections had acceptable reliabilities. The significance level was set beforehand at .05.

Results

Twenty-nine percent of the respondents were identified as having a converger-type learning style, 26 percent a diverger style, 20 percent an assimilator style and 25 percent an accommodator style. No statistical relationships were found between learning styles and demographic variables such as age, gender, and job responsibility. The converger style was preferred by professional Extension staff while the office workers preferred the diverger style (Table 1). This was similar to results reported by Rollins and Yoder (1993), and it fits the description of the converger style preferred by technical persons and the diverger by the service sector. When staff were distributed by main area of responsibility, it was evident that those with agricultural responsibilities preferred the converger learning style (Table 2).

Table 1. Distribution of Extension personnel by merged job position and learning style (N=177)

Job Position	Converger		Diverger		Assimilator		Accommodator		Chi-Square	Degree of Freedom	p-value
	N	%	N	%	N	%	N	%			
On-campus staff	24	32.88	13	17.81	12	16.44	24	32.88	13.47	6	.036
Off-campus staff	20	34.48	17	29.31	9	15.52	12	20.69			
Office workers	8	17.39	16	34.78	14	30.43	8	17.39			
Total	52	29.38	46	25.99	35	19.77	44	24.86			

Table 2. Distribution of Extension personnel by main area of responsibility and learning style

Job Responsibility	Converger		Diverger		Assimilator		Accommodator	
	N	%	N	%	N	%	N	%
Agriculture	12	36.36	7	21.21	7	21.21	7	21.21
Home economics	8	38.10	3	14.29	4	19.05	6	28.57
Youth	7	29.17	7	29.17	2	8.33	8	33.33
Community development	3	42.86	2	28.57	0	0.00	2	28.59
Engineering	3	37.50	4	50.00	1	12.50	0	0.00
Education	3	25.00	4	33.33	2	16.67	3	25.00
Administration	3	21.43	3	21.43	5	35.71	3	21.43
Office workers	8	17.39	16	34.78	14	30.43	8	17.39
Other	5	27.27	0	13.64	0	22.73	8	36.36
Total	52	29.38	46	25.99	35	19.77	44	24.86

The participants were asked to respond to 11 items on their preferences for specific ways to receive computer training and support. When grouped by learning style, there were significant differences at the .05 level for tutorial computer disks and satellite training (Table 3). There were no differences due to learning style for needed computer assistance (Table 4) or for computer knowledge (Table 5).

Table 3. Analysis of variance of means of respondents' preferences to receive training and support items by learning style

No.	Item	Converger (N=52)	Diverger (N=48)	Assimilator (N=35)	Accommodator (N=44)	F Value	F Prob.
1	Personalized	4.42	4.30	4.22	4.34	1.87	.1370
2	Telephone	3.37	3.16	3.11	3.41	0.88	.4521
3	On-campus	3.52	3.69	3.42	3.17	1.63	.1846
4	Periodical newsletter	3.35	3.27	3.14	3.37	0.39	.7616
5	Tutorial computer disks	3.08^{a}	3.62^{b}	3.08^{c}	3.50^{d}	4.09**	.0078
6	Video tapes	2.85	3.20	3.08	3.24	1.73	.1629
7	Via EXNET	2.60	3.02	2.64	2.93	1.74	.1611
8	Program documentation	3.27	3.44	2.89	3.15	2.28	.0811
9	Satellite	2.50^{a}	2.96^{b}	2.75^{c}	3.22^{d}	5.39**	.0014
10	User-friendly manual	4.10	3.74	3.61	3.80	2.23	.0866
11	Combination of manual video and computer disk	3.60	3.78	3.50	3.83	1.19	.3139

**Highly significant; $p < .01$; 5. b > a; 9. d > a

Table 4. Analysis of variance of means of needed assistance items by learning style

No.	Item	Converger (N=52)	Diverger (N=46)	Assimilator (N=35)	Accommodator (N=44)	F Value	F Prob.
1	Basic introduction to computers	1.79	1.87	1.89	1.98	0.24	.8681
2	Specific software programs	3.90	3.91	3.64	3.89	0.88	.4543
3	Computer programming	3.10	3.22	3.17	2.96	0.38	.7668

Table 4. Continued

No.	Item	Converger (N=52)	Diverger (N=46)	Assimilator (N=35)	Accommodator (N=44)	F Value	F Prob.
4	Information retrieval and exchange (EXNET)	3.00	2.80	2.97	2.80	0.32	.8100
5	Purchasing new equipment	3.02	2.87	2.67	2.89	0.56	.6444
6	Upgrading software	3.48	3.36	3.06	3.33	1.03	.3795

Table 5. Analysis of variance of means computer knowledge items by learning style

No.	Item	Converger (N=52)	Diverger (N=46)	Assimilator (N=35)	Accommodator (N=44)	F Value	F Prob.
1	System	3.44	3.43	3.50	3.22	.65	.5835
2	Word	3.96	3.98	3.94	3.87	.15	.9286
3	Spreadsheet	3.08	2.83	3.03	2.80	.78	.5074
4	Graphic	2.54	2.48	2.83	2.46	.80	.4940
5	Statistical	2.33	2.33	2.69	2.09	1.98	.1192
6	Communication	3.29	3.09	3.19	3.11	.34	.7911
7	Language	2.08	2.50	2.53	2.41	1.81	.1471

Educational Importance

Identification of learning styles of Extension personnel was important, because the information can be used in several ways in a training setting. In the design of training programs, state specialists can plan to use the teaching methods most suited to the preferred learning style of the majority of the potential participants. Individuals whose preferred styles differed from the norm could be identified and given special attention. Because the professional staff tends toward the converger style of learning, computer training for them should include the presentation of concepts and then the opportunity for them to experiment with what has been presented.

Because the office assistants and secretaries tend to prefer the diverger styles of learning, their computer training should start with hands-on situations and then provide an opportunity for them to share with each other what they have done, thereby reflecting on what they have learned. There was not a preferred style for any group. The results of this study may indicate that it is important to use a variety of teaching methods in training in order to connect with a wide spread of preferred learning styles.

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LINKING VOCATIONAL AGRICULTURE TO LABOR MARKET NEEDS: LESSONS FROM SWAZILAND AGRICULTURAL EDUCATORS

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LINKING VOCATIONAL AGRICULTURE TO LABOR MARKET NEEDS: LESSONS FROM SWAZILAND AGRICULTURAL EDUCATORS

Introduction and Conceptual Framework

The acceptance of the premise that schools have the mandate to prepare young people for full participation and membership in society implies that schools accept a position of responsibility for the employability of its graduates. In both industrialized and less industrialized economics and in view of the prevailing global economy, this mandate must be met and schools should be given further appropriate resources to meet this expectation. The mandate must of necessity entail the preparation of young people for the labor market. "By equipping the majority of young people with appropriate skills, it should be possible to increase labor productivity and economic performance" (Atkins, 1986, p. 49). Vocational education at the secondary school level is aimed at preparing the youth for initial entry into employment (Calhoun & Finch, 1982). It is economic education as it is geared to the needs of the job market and, thus, contributing to national economic strength (Calhoun & Finch, 1982). Demonstrating commitment to educational reform and acknowledging that the educational enterprise is not separate from the world of work, the Swaziland government has embarked on vocationalization of the secondary/high school curriculum of the practical arts, namely, agricultural, commercial, home economics, and technical studies (Educansult Limited, 1992).

In the opinion of Lauglo and Lillis (1988), rationalization of policies to vocationalize selected components of the secondary curriculum in developing nations are a "quest for greater labor market relevance of education; for better articulation between the content of schooling and subsequent application of acquired skills . . . in the world of work" (p. 8). In addressing the problem of curriculum relevance and youth unemployment in Swaziland, linkages between schools (education) and business-industry (collaborative education) have become a major factor in vocationalizing the secondary curriculum of the practical arts (Mndebele & Lukhele, 1993).

The concept of collaboration in the context of professional vocational education teacher competence to enhance linkages between school and business-industry in Swaziland, vocational teacher competence has implications for the improvement of vocational teacher performance. A major purpose of vocational education is to provide individuals with the competencies needed for jobs in the market place. Vocational education makes a difference in the productivity level of the workforce by improving vocational training programs and providing training to marginally productive workers Braden (1984). "Training alone will not result in increased employment. Vocational educators need to assess employer needs which translate directly into employment opportunities. Vocational education, thus, has the potential to play a more significant role in the nation's economic growth and development" (Braden, 1984, p. 119). Assessment of employer needs calls for collaboration between the private sector and vocational educators.

On the concept of collaboration, Hoyt (1991) expressed that:

> Positive relationships between the private sector and educators can best be developed by taking advantage of the unique skills and knowledge that each has to offer. People from the private sector have knowledge regarding the nature of the emerging workplace and the kinds of competencies and skills that are required for success. Educators can contribute knowledge regarding how to organize materials for effective instruction how to relate with pupils in positive ways, and how to help students learn" (p. 451).

Barton (1991) on encouraging schools to work with employers to promote collaborative education, explicated that "in collaborative education, schools provide academic instruction and cover the theoretical aspects of occupational training, while local employers provide practical instruction at the worksite" (p. 52). Collaborative education smoothes the transition between school and work. "Work-based learning is the key to school-to-work transition" (Hoerner, 1993, p. 12). As conceptualized by Hoerner (1993), work-based learning is "the knowledge/learning imparted to every student from the beginning of schooling which maintains a theme or focus that people work in order to live and that there is a positive 'connectedness' between the schooling process and living productive lives" (p. 6).

In a study of 32 agricultural businesses and industries in Swaziland, McCorkle (1987) reported that 68% of industries surveyed expressed a need for collaboration between business-industries and Faculty (College) of Agriculture. Further, 84% of the surveyed industries expressed their willingness to collaborate with the Faculty (College) of Agriculture in the following areas: a) interchange of knowledge, research, and skills; b) share their industry's highly experienced training officers for purposes of exchanging ideas; c) help the University of Swaziland develop a more practical program so that students would improve their ability to put theory into practice; d) help students with career guidance so that they might train with a purpose in mind; e) provide opportunities, for field trips; and f) provide guest speakers for class lectures. Finally, 56 parents of the surveyed agricultural industries affirmed their interest in offering vocational employment to university students to allow them to gain work experience in the world of work.

Purpose

This study determined the importance of professional vocational education competencies needed by Swaziland agricultural teachers to enhance collaboration/linkages between school and business-industry for school-to-work transition of vocational agriculture students. Further, the study determined the extent to which the teachers have the ability to perform these competencies. Specifically, the objectives of the study were to: 1) determine the perceptions of the agricultural teachers regarding the magnitude of the importance of the 47 competencies; 2) ascertain the agricultural teachers' ability to perform the 47 competencies; and 3) determine if a statistical differences existed between importance and performance.

Methodology

Development of the professional vocational education competencies was conducted in two, one-day focus group (Krueger, 1987; and Krueger, 1988) workshops with Swaziland professionals, namely, teacher educators, curriculum development specialists, and senior inspectors (supervisors) from the four specialty areas of agricultural, commercial (business), home economics, and technical studies (Mndebele & Crunkilton, 1993). The results of the workshops were a profile of 161 professional vocational technical education competencies for Swaziland secondary/high school vocational teachers. From the profile of competencies, a questionnaire was formulated with importance and performance scales. Values on each scale ranges from 5 to 0 (very high importance to no importance of the competency) and 5 to 0 (excellent ability to no ability to perform the competency). The questionnaire was validated and pilot tested in Swaziland. A random representative sample of 57 from 200 population of agricultural teachers were mailed the questionnaire. A 100% rate of return was obtained. The questionnaire was assessed for reliability based on Cronbach's alpha with the following coefficient values for importance and performance scales: school and business-industry relations, .89 (importance) and .93 (performance); career guidance, .89 (importance) and .94 (performance); and program evaluation, .89 (importance) and .92 (performance). To analyze and interpret the mean importance and performance ratings, midpoints of the measurement questionnaire scales were used (Kirby & Browning, 1990).

Results and Conclusions

Research Question 1

Importance mean values in the competency area of School and Business-Industry Relations ranged from 4.21 to 3.79 indicating a "high importance" rating of all the competencies. The highest rated competency was, "Conducting a survey of business and industry to determine prospective employer/occupational needs in your teaching/specialty area" (4.21). On the other hand, the lowest rated competency was, "Updating internship experience (cooperative education) records of vocational technical students" (3.79). These data were reported in Table 1.

In the competency area of Career Guidance, importance mean values ranged from 4.31 to 3.63 reflecting a "high importance" rating of all competencies. The competency, "Disseminating occupational/career information to vocational technical students" (4.31) was rated highest in importance. These data were reported in Table 2. Rated lowest in importance was the competency, "Interpreting occupational test results to vocational technical students" (3.63), indicating a "high importance" rating. These data were reported in Table 2.

In the competency area of Program Evaluation, the competency rated highest in importance was, "Conducting a student follow-up evaluation as a part of a vocational technical education program" (4.19), a high importance rating. On the other hand, rated lowest in importance was the competencies, "Using vocational technical evaluation techniques and instruments designed to diagnose vocational technical students' academic, occupational, and social development needs" (3.89), and "Evaluating vocational technical instruction using a variety of techniques to determine the effectiveness in helping vocational technical students attain occupational goals" (3.89), both "high importance" ratings. These data were reported in Table 3.

Research Question 2

In Table 1 competency area, School and Business-Industry Relations, the competency, "Evaluating vocational technical students' internship (cooperative education) experiences with business and industry" (2.98) was rated highest in ability to perform and placed in the "good ability" category rating. However, rated lowest in ability to perform was the competency, "Developing criteria and procedures for selecting and assigning vocational technical students for internships" (cooperative education) (2.68), a "good ability" rating.

In the competency area of Career Guidance rated highest in ability to perform was the competency, "Writing letters of recommendation for job/college/university/placement for vocational students" (3.44), a "good ability" rating. These data were reported in Table 2. The competency, "Establishing communication channels for information exchange and cooperation with career guidance school personnel" (2.82), a "good ability" rating, was rated lowest in ability to perform.

The competency, "Conducting a student follow-up evaluation as a part of a vocational technical education program" (3.42), a "good ability" rating, was rated highest in ability to perform in the competency area of Program Evaluation. These data were shown in Table 3. Rated lowest in the ability to perform was the competency, "Using vocational technical evaluation techniques and instruments designed to diagnose vocational technical students' academic, occupational and social development needs" (2.89), a "good ability" rating.

Research Question 3

Paired t-test were computed to determine if statistical significant differences existed between importance and performance mean values. A null hypothesis to be tested was that the mean differences would be equal to zero at the .05 alpha level. The results as shown in Tables 1, 2 and 3 revealed that there was a statistical significant difference with each of the importance and performance mean values. Therefore, the null hypothesis of no mean differences was rejected for all 47 pairs of mean values.

The results of the study led to the conclusion that all the competencies developed by the Swaziland professionals in the focus group workshops were important and relevant for vocational agriculture classroom teachers to possess. These competencies must be incorporated in the preservice vocational teacher education program to enable future teachers to link the delivery of vocational agriculture to prospective employers' needs in business and industry. Further, the vocational agricultural teachers would be enabled to guide and link their students' career needs to labor market needs of the Swaziland economy.

The self-reported performance of vocational agricultural teachers revealed that there was a statistical significant difference between importance and performance confirming the need for inservice vocational teacher education of current teachers of agriculture in Swaziland. The results of this study are generalizable to the rest of the population of agricultural teachers.

Implications/Educational Importance

Sustained economic growth in less industrialized countries remains an impossibility unless there is an adequate and competent labor force from which business and industry can recruit. The agro-industrial economy is pivotal for many less industrialized countries, Swaziland inclusive. Linkages between vocational agriculture and agro-business industries render the curriculum relevant in the preparation of youth for wage and non-wage agricultural occupations/careers. In the wake of high youth unemployment in Swaziland and in the Southern African Development Community (SADC) region, the results of this study have pointed to the need to engage business and industry in vocational program development and evaluation and career development for Swaziland youth and to focus on the enhancement of teachers' professional competence in the teacher education program.

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Table 1

Means and T-Values of School and Business-Industry Relations Competencies for Swaziland Vocational Agricultural Teachers

Competency	Importance mean sd n=57	Performance mean sd n=57	T-Value
1. Collaborating with business and industry in planning and conducting technical education program.	4.19 .79	2.88 1.38	7.08*
2. Conducting a survey of business and industry to determine prospective employer/occupational needs in your teaching/specialty area.	4.21 .77	2.93 1.27	7.92*
3. Working with business and industry in selecting vocational technical education content in your specialty area.	4.02 .88	2.82 1.30	6.99*
4. Determining the present and future socio-economic conditions in the community.	3.88 .91	2.93 1.28	7.36*
5. Planning internships (cooperative education) with business and industry for vocational technical students.	4.00 .81	2.79 1.28	6.89*
6. Developing criteria and procedures for selecting and assigning vocational technical students for internships (cooperative education).	3.84 .88	2.68 1.18	8.34*
7. Matching attitudes and interests of vocational technical students to job/internship experience (cooperative education) placement.	3.91 .81	2.96 1.16	6.36*
8. Developing a contract agreement with business and industry for vocational technical student internship (cooperative education) experiences.	3.89 .91	2.84 1.40	6.11*
9. Implementing a system for coordinating the learning experiences of vocational technical education students during their internship (cooperative education) with business and industry.	4.04 .78	2.79 1.32	7.24*
10. Supervising vocational technical student internship experiences (cooperative education) in relationship to expected on-the-job experiences and provide on-site instruction as needed.	4.16 .84	2.93 1.35	6.87*
11. Supervising vocational technical student internship (cooperative education) as a joint responsibility of both the vocational technical teacher and business/industry representatives.	3.96 .84	2.97 1.22	5.89*
12. Updating internship experience (cooperative education) records of vocational technical students.	3.79 .92	2.90 1.20	5.79*
13. Evaluating vocational technical students' internship (cooperative education) experiences with business and industry.	3.86 .77	2.98 1.23	5.47*
14. Instructing students in the principles and practices of internship experiences (cooperative education) in vocational technical education.	3.82 .98	2.88 1.36	6.11*
15. Preparing on-site supervisors who will be working with students in vocational technical education internships.	4.18 .93	2.96 1.25	7.31*

*p<.05 Significance level

Importance Scale: 5=of very high importance; 4=of high importance; 3=of medium importance; 2=of low importance; 1=of very low importance; 0=of no importance

Performance Scale: 5=of excellent ability to perform; 4=of very good ability to perform; 3=of good ability to perform; 2=of fair ability to perform; 1=of poor ability to perform; 0=of no ability to perform

Table 2

Means and T Values of Career Guidance Competencies for Swaziland Vocational Agricultural Teachers

Competency	Importance mean sd n=57	Performance mean sd n=57	T-Value
1 Disseminating occupational/career information to vocational technical students	4.31 .74	3.33 1.06	7.49*
2 Interpreting occupational/career information to vocational technical students	4.09 .79	3.32 1.04	4.50*
3 Assessing vocational technical students aptitude/ability for occupations available in Swaziland	4.21 .70	3.23 1.10	6.78*
4 Providing vocational technical education information to all students.	3.81 1.03	3.00 1.22	4.50*
5 Providing services needed to assist vocational technical students in making the transition from school to employment	4.30 73	3.11 1.14	7.69*
6 Providing services needed to assist vocational technical students in making a transition from secondary/high school vocational technical education to the post-secondary/college/university level	4.18 .71	3.18 1.23	6.32*
7 Preparing vocational technical students to transfer vocational technical competencies from one occupation to another.	3.77 .85	2.82 1.15	7.10*
8 Guiding vocational technical students to develop decision making skills, self-awareness, interpersonal skills and effective communication with employers/clients.	4.21 .90	3.23 1.09	6.68*
9 Directing vocational technical students to relevant literature and agencies outside the school that provide information on specific aspects of different occupations.	4.04 .84	3.14 1.14	7.05*
10 Guiding vocational technical students in discussing their own occupational/career aspirations	3.91 81	3.04 1.12	6.39*
11 Conducting home visitations to assess vocational technical students' self-employment career opportunities	4.18 .87	3.05 1.20	7.18*
12 Conducting individual conferences with vocational technical students on career aspirations and job opportunities.	3.74 1.01	2.89 1.14	6.06*
13 Conducting group conferences with vocational technical students on career aspirations and job opportunities.	3.88 1.02	3.11 1.11	5.07*
14 Interpreting occupational test results to vocational technical students.	3.63 92	2.91 1.24	4.45*
15 Establishing communication channels for information exchange and cooperation with career guidance school personnel.	3.647 99	2.82 1.26	5.79*
16 Providing career guidance school personnel with vocational technical student performance data	3.93 .83	2.95 1.18	6.76*
17 Collaborating with the Ministry of Education, Educational Testing, Guidance and Psychological Services for the administration of aptitude tests to vocational technical students.	3.81 1.01	2.86 1.22	6.98*
18 Guiding vocational technical students in best describing their marketable/salable skills	3.91 91	3.14 1.08	5.45*
19 Writing letters of recommendation for job/college/university/placement for vocational students	4.11 .92	3.44 1.15	5.64*
20 Instructing vocational technical students in securing and completing applications for jobs, scholarships, or admission to college/university.	3.89 1.19	3.39 1.05	3.29*

*p<.05 Significance level

Importance Scale: 5=of very high importance; 4=of high importance; 3=of medium importance; 2=of low importance; 1=of very low importance; 0=of no importance

Performance Scale: 5=of excellent ability to perform; 4=of very good ability to perform; 3=of good ability to perform; 2=of fair ability to perform; 1=of poor ability to perform; 0=of no ability to perform

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Table 3.

Means and T-Values of Program Evaluation Competencies for Swaziland Vocational Agricultural Teachers

Competency	Importance mean sd n=57	Performance mean sd n=57	T-Value
1. Specifying evaluation techniques and criteria which determine satisfaction of minimum as well as desirable student performance at the completion of the learning activities.	4.14 .95	3.35 1.11	5.99*
2. Outlining the procedures used to evaluate a vocational technical education program.	4.11 .99	3.30 1.09	6.15*
3. Conducting a student follow-up evaluation as a part of a vocational technical education program.	4.19 .77	3.42 .91	6.29*
4. Using vocational technical evaluation techniques and instruments designed to diagnose vocational technical students/ academic, occupational and social development needs.	3.89 .86	2.89 1.06	7.29*
5. Evaluating vocational technical instruction using a variety of techniques to determine the effectiveness in helping vocational technical students attain occupational goals.	3.89 .94	3.00 1.15	5.75*
6. Establishing criteria for evaluating the appropriateness of the vocational technical education program.	3.95 .97	2.95 1.25	5.71*
7. Providing constructive input to the Inspectorate division of the Ministry of Education in evaluating school vocational technical education programs.	4.04 .78	3.14 1.13	6.92*
8. Evaluating relevance of research findings to vocational technical education in Swaziland.	4.07 .78	3.28 1.18	4.94*
9. Assessing students' performance of competencies as the primary source of evidence of skill acquisition.	4.11 .84	3.37 1.03	6.84*
10. Determining vocational technical students' rates of progress through the vocational technical education program by demonstrated competency rather than by time or course completion.	4.05 .93	3.30 1.24	6.12*
11. Evaluating vocational technical students' interests and abilities to pursue a chosen occupational.	4.00 .87	3.07 1.10	8.34*
12. Constructing vocational technical education student evaluation instruments/grade sheets.	4.04 .91	3.32 1.15	6.47*

*p<.05 Significance level

Importance Scale: 5=of very high importance; 4=of high importance; 3=of medium importance; 2=of low importance; 1=of very low importance; 0=of no importance

Performance Scale: 5=of excellent ability to perform; 4=of very good ability to perform; 3=of good ability to perform; 2=of fair ability to perform; 1=of poor ability to perform; 0=of no ability to perform

FIELD ATTACHMENT PROGRAMS AS PERCEIVED BY STUDENTS, LECTURERS, AND EMPLOYERS IN SWAZILAND

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FIELD ATTACHMENT PROGRAMS
AS PERCEIVED BY STUDENTS, LECTURERS, AND EMPLOYERS
IN SWAZILAND

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Introduction

The Field Attachment or internship programs are relatively new in the Faculty of Agriculture of the University of Swaziland(UNISWA). The programs were introduced in the curriculum during the 1991/92 academic year. Field Attachment programs are of valùe to the student, employer and the institution training prospective employees. Students are able to relate to the operations of their chosen field and make career decisions, acquire skills of immediate relevance to the work place, and improves their job prospects after graduation and may hasten Promotional prospects (Dehmlow and Kjelgren, 1992). Field Attachment programs benefit employers by giving them an inside tract on the quality of employees. In cases where an intern happens to have become an employee of the company where the internship was done - the employer saves on induction time. The institutions involved in training benefit from field attachment as such institutions become aware of industry's needs and thus become sensitive in producing relevant curricula.

Objectives

The study was designed with the following objectives:

1) to describe the combined attitudes of students, lecturers and employers regarding the Field Attachment Programs conducted by the Faculty of Agriculture at the University of Swaziland.

2) to determine whether there were significant differences between respondents attitudes toward the field attachment programs conducted by the Faculty of Agriculture by gender, position held and marital status.

3) to describe the relationships between respondents (students, lecturers and employers) attitudes and their selected demographic characteristics (age, and qualification).

Methodology

A descriptive study of the survey type and qualitative procedures were used in addressing the research problem. The target population for this study included all students (n = 16), employers (n = 13), lecturers (n = 16), who were involved in the Field attachment Programs during the 1992/93 academic year. The study was a census since all units in the target population were involved in the study. Thus, sampling error was eliminated . Content validity and reliability of the Likert type instrument were established. Reliability coefficients were found to be .90, .83, and .85 for the UNISWA students, value of Field Attachment Programs, and General issues domains, respectively. Selection and non-response errors were controlled. Qualitative information were also collected to enrich the quantitative data. Descriptive, inferential statistics, and qualitative procedures were employed for data analysis. Though, this study was a census, inferential statistics procedures were employed as respondents were considered a sample at one point in time. The alpha level was set a priori at .05.

RESULTS

QUANTITATIVE INFORMATION

Respondents were provided with statements and were asked to indicate the level of agreement on each statement, on a scale of 1 (strongly disagree); 2 (slightly disagree); 3 (disagree); 4 (agree); 5 (slightly agree) and 6 (strongly agree).

When interpreting the data , overall means of 3.5 and above were taken to denote agreement or positive attitude and overall means of below 3.5 denoted disagreement or negative attitude.

Attitudes of Prospective Employers of UNISWA-Luyengo Graduates, UNISWA Luyengo Agriculture Lecturers and UNISWA-Luyengo Students Toward Field Attachment Programs

Information contained in Table 1 indicated that UNISWA students have a positive attitude toward field attachment programs with an overall mean rating of 4.36. The table denotes that the UNISWA students were ambitious ($\bar{X}$= 4.22), conscientious ($\bar{X}$ = 4.11), responsible ($\bar{X}$ = 4.11), and have acceptable writing skills for employment ($\bar{X}$ = 4.09).Students'agricultural skills needed for entry level employment, and desirable work habits had ratings of 3.82 and 3.93 respectively.

Attitude of Prospective Employers, UNISWA Agricultural Lecturers and UNISWA Agricultural Students Toward the Value of Field Attachment Programs

Field attachment in agriculture was set to provide students with several opportunities before completing their training at UNISWA. Table 2 indicated that respondents agreed that the field attachment program does provide the students with those opportunities mentioned especially to experience situations that are not provided

Table 1: Attitudes of Respondents Toward the Field Attachment Program Regarding UNISWA Students (N = 45)

STATEMENT	LEVEL OF AGREEMENT $\bar{X}$	S.D
UNISWA STUDENTS:		
1. Know how to perform basic agriculture skills needed for entry level employment	3.82	0.88
2. Have desirable work habits	3.93	0.80
3. Are ambitious	4.22	1.03
4. Conscientious	4.11	0.92
5. Are responsible	4.11	1.02
6. Have acceptable writing skills for employment	4.09	1.07
7. Have positive attitudes towards field attachment in agriculture programme	4.36	1.01
8. Have acceptable English skills	4.31	0.92
OVERALL RATING	4.12	0.96

in the classroom ($\bar{X}$ = 5.31), and that students are able to operate equipment that may not be available at UNISWA ($\bar{X}$ = 5.02). The overall mean rating for this domain was found to be 4.86. The conclusion drawn was that respondents had a positive attitude toward the field attachment programs.

Attitudes on General Concerns Regarding Field Attachment Programs in Agriculture

Table 3 revealed that employers do not value previous work experience as a condition for hiring UNISWA graduates ($\bar{X}$ = 2.82). Employers were also willing to co-operate with the university of Swaziland and prefer to hire UNISWA graduates who have successfully completed a field attachment program ($\bar{X}$ = 4.38). In terms of orientation ($\bar{X}$ = 4.36), adequate training and evaluation by employers, respondents were positive with regard to these activities.

Table 2: Attitudes of Respondents Toward the Value of Field Attachment Programs (N = 45)

STATEMENT	LEVELS OF AGREEMENT	
	$\bar{X}$	S.D
FIELD ATTACHMENT IN AGRICULTURE PROGRAM PROVIDES STUDENTS WITH OPPORTUNITIES TO:		
9. Test career goals	4.89	0.88
10. Learn about the occupation of choice through work experience	4.96	0.76
11. Develop a mature attitude towards academic preparation	4.49	0.86
12. Relate classroom instruction to occupational goals	4.78	0.81
13. Experience situations that are not provided in the classroom	5.31	0.76
14. Operate equipment that may not be available at UNISWA	5.02	0.95
15. Improve business communication with... a. employees	4.96	0.82
b. employers	4.80	1.02
c. customers	4.73	1.02
d. peers	4.69	0.87
OVERALL RATING	4.86	0.88

Differences in Attitudes of Respondents Toward Field Attachment Programs

One way analysis of variance was used to determine whether there was a significant difference between the attitudes held by respondents regarding the field attachment programs by gender, marital status, and position held (whether student, employer or lecturer). Results revealed that there was no significant difference for the three domains studied, consisting of: value of field attachment; UNISWA students; and the general issues.

The data support Fisher's view (1987) that evaluation of an educational program was an essential step in the elimination of inequities in performance based on gender; and that researchers (Herzberg, 1957) have failed to establish significant differences between married and unmarried workers.

Table 3: Attitudes of Respondents Regarding General Concerns with Field Attachment (N = 45)

STATEMENT	LEVEL OF AGREEMENT X	 S.D
1. Employers do not value previous work experience as a condition for hiring UNISWA graduates	2.82	1.06
2. Employers want to cooperate with UNISWA regarding the Field Attachment Program	4.49	0.806
3. Employers prefer hiring UNISWA graduates who successfully completed a Field Attachment Program	4.38	1.02
4. Employers give UNISWA students a proper job orientation before beginning a Field Attachment Program	4.36	1.01
5. Employers give students a proper evaluation of job performance during Field Attachment Program	4.13	0.69
6. Employers provide students with industry related work experiences	4.78	0.81
7. Employers properly supervise students at the work place while they are doing the Field Attachment Program	4.22	0.87
8. UNISWA lecturers properly supervise students while doing the Field Attachment Program	4.18	1.12
9. UNISWA students have an opportunity to do field attachment jobs that match their career interests	4.33	1.03
OVERALL RATING	4.19	10.93

The Relationship Between Age, Qualification and Attitudes of Respondents Toward Field Attachment Programs

In this study, the relationship between each of the selected characteristics (qualification and age) of respondents was identified and described, using descriptors developed by Davis (1971). The relationship between age, qualification and respondents' attitudes toward field attachment programs revealed low to negligible association (Table 4).

Table 4: The Relationship Between Age, Qualification and Respondents' Attitudes Toward Field Attachment Programs (N = 45)

	Qualification r_s	Age r
1. UNISWA Students	0.12	0.15
2. Field Attachment Program	0.17	0.15
3. General Concerns	0.08	0.12

QUALITATIVE INFORMATION

Students Attitudes

The students gave the following comments and suggestions during the analysis of Field Attachment:

- supervision should be more frequent; students should be able to plan their work and be able to conduct a job description and to work with the subject matter specialists from the Faculty.
- choice of company or placement area should be up to students; students should have the opportunity to visit the company to have an idea of the activities and the attitude of the employers.
- accommodation should be provided by the company for students, or otherwise, incentives should be given to students to compensate for accommodation.
- field attachment allowances should be increased to permit students to work for ten weeks without financial problems, as food, housing and transport costs increases regularly.
- employers should be briefed so that they are able to write sound training plans; these training plans should be ready before the attachment commences; employers should be briefed about the objectives of Field Attachment.
- period of attachment should be divided into two sessions due to seasonal agricultural production.
- evaluation method should be formative to assess whether the objectives are met adequately; lecturers of relevant subject matters should assess on regular basis.

Employers Attitudes

Employers gave their comments and suggestions as follows:

- period of attachment should be twice a year, winter time is all right, but a period of 3 to 5 weeks should be added in summer time.
- field attachment allowance should be reviewed every 2 years, specially for food and accommodation to keep in line with inflation.
- length of supervision by faculty staff members should be increased to enable staff members to know students' activities and problems.
- selection of students for attachment should be done by employers.
- internship should be compulsory for every student, and more than one student should be attached to one company.

Employers, supervisors, and faculty staff members agreed on a list of recommendations and conclusions, as follows:

- the students should be able to choose a single objective related to the area of training.
- field trips should be organized for students to various companies for orientation before the field attachment period.
- students were not able to learn management skills due to lack of time.
- the present timing of attachment is all right, changing to two periods will interfere with lecturing.
- company's brochures should be made available to the University Library for the benefit of staff and students.
- employers should be given a copy of the University Calendar, and in addition, a list of the courses taken by students.
- companies should not conduct interviews for the purpose of selection. However they should brief the students on the rules and regulations of the company.
- students should be sent out to the firms after the results are officially communicated because the Senate meeting on exams takes place later in June.
- students should inform their employers when they fail their exams and in which week they have to leave for supplementary examinations.
- the Consultative Committee should be revived and meet more often.

Achievement of Field Attachment Objectives

Most employers indicated that the program objectives were achieved in a very positive way. They also agreed or strongly agreed with the following problems:

- level of field experience too low
- inadequate supervision by Uniswa staff, participation of various departments in supervising practicals and supervision by subject matter specialist
- lack of certain technical knowledge by students
- shortage of accommodation
- absence of provision of protective clothing
- managers not familiar with program objectives and overall planning of field attachment.

CONCLUSIONS

1. The attitudes of agricultural employers, University of Swaziland agricultural students involved in the Field Attachment Programs, College of Agriculture Lecturers at the University of Swaziland had a positive attitude toward the "students who were involved in the Field attachment Programs", "the opportunities provided by the Field Attachment Programs in agriculture', as well as the "cooperation between employers and the University of Swaziland."

2. Gender, qualification, age, position held, and marital status had no major influence on how the field attachment programs were viewed by employers, students and lecturers.

EDUCATIONAL IMPORTANCE

This paper was a case study on how a training institution in a developing country could foster cooperation with private sector; demonstrated the value of Field Attachment Programs; and the study indicated the issues to be considered in the implementation, supervision and evaluation of Field Attachment Programs.

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Session E GLOBAL ENVIRONMENTAL CONCERNS

1. **Agricultural Education and Global Sustainability**
   George R. Vahoviak
   Arlen W. Etling

2. **Environmental Concerns in Rural Pakistan**
   Mohammad Anwar
   Layle D. Lawrence

3. **Socio-economic Dimensions of Sustainable Agricultural Development: The Case of Peri-urban Agriculture in Trinidad**
   Joseph Seepersad

4. **Arresting Deforestation in the Amazon**
   Douglas Speicher
   Arlen Etling

AGRICULTURAL EDUCATION AND GLOBAL SUSTAINABILITY

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Introduction

> Humanity's struggle both to feed the poor and to overfeed the rich constitutes one of the principal causes of environmental degradation, one that perhaps will be the most difficult to correct. But it must be corrected if Earth is to be healed. Because of the size of the human population, the nature of many diets, and the way most agricultural systems are run, eating is one of the most ecologically destructive of all human activities. (Ehrlich & Ehrlich, 1991, p. 193)

Agricultural Education is education both in and about agriculture. Agriculture is in the midst of a two-sided dilemma documented by Brown (1994): feeding an exponentially growing world population of some 5.5 billion people, and trying to do this in an environmentally sound manner. The authors believe that the institution of industrialized agriculture demonstrates traits of unsustainability similar to those of other institutions of industrialized nations. A growing awareness of the impact of industrialization and population on the planet have led many authors to address the alternative paths to achieve global sustainability. At the heart of these discussions is agriculture and the overall impact that satisfaction of industrialized human needs has on the environment. Therefore, agricultural educators have the potential to greatly help or hinder efforts to achieve global sustainability.

Authors such as David Orr argue that we must face the illusion of sustainable development (World Commission on Environment and Development, 1987) as being an attempt to appease both economists and ecologists. Orr (1992) describes an alternative to sustainable development which he aptly names ecological sustainability. Ecological sustainability can be achieved through an array of societal, political, economic, and educational changes. Education which allows people to learn how to live well within their place, which is connected to and bounded by environmental parameters, and which generates ecological literacy is seen as the force needed to initiate a movement toward ecological sustainability. Beginning with existing elements of both formal and nonformal education, agricultural education, environmental education, (EE) and Science, Technology, and Society (STS) disciplines hold the promise of evolving into education for ecological sustainability.

Purpose

The purpose of this philosophical paper is to build bridges between agricultural education and global sustainability by presenting an argument for the reformation of agricultural education into a multi-disciplinary educational focus incorporating EE and STS, with ecological literacy as its collective goal. The potential diversity of agricultural education and the importance of agriculture in the sustainability literature emphasize their interdependence. This paper addresses possible strategies for a collaboration of agricultural education, EE, and STS to occur. The results of this paper suggest ways to build bridges between agricultural education and sustainability based upon the concept of ecological literacy.

Methods

This paper emerged from a doctoral dissertation completed in 1993. The procedure used in building this paper centered around four areas of study: agricultural education, agriculture, sustainability, and education for sustainability. Based on a review of the literature within agricultural education, this paper builds on the theme that agricultural education is in a period of openness to change, expansion, and curriculum changes. Additionally, the review of literature yielded important insights into the historical development of modern agriculture, including a broad examination of the current situation with respect to agriculture, global environmental problems, social problems, and various interpretations of global sustainability. Analyzing current literature on education for sustainability demonstrates the compatibility of agricultural education, EE, and STS with respect to becoming the foundation for ecological literacy. Ecological sustainability is chosen as the preferred interpretation of sustainability and the paper closes with a discussion of proposed methods for agricultural education to promote ecological sustainability through ecological literacy.

Results and Conclusions

The discussion about philosophy of agricultural education in The Agricultural Education Magazine (Zurbrick, 1990; Osborne, 1993) during the past several years characteristically represents a forward looking philosophy for agricultural education. With the issuance of the report Understanding Agriculture: New Directions for Education (NRC, 1988), vocational agriculture became agricultural education, emphasis was placed on education both in and about agriculture, and issues of white male domination and the universal need for agricultural literacy were all brought to national attention. Nonetheless, the agriculture proposed as the content of agricultural education is very unsustainable and fails to mention sustainability.

Ecological literacy as defined by David Orr (1992) provides a model for orienting education toward achieving sustainability. Sustainability rests on the principles of renewable energy sources, regionalized approaches to food and goods production, community, distinguishing needs from wants, and strong civic participation by all. Rather than being an industry, agriculture may well become an integral part of every community and household. If agricultural education is to contribute meaningfully to global sustainability, it must adopt a new philosophy and reorient its mission toward ecological literacy.

The literature on sustainability consistently suggests that decentralization of production, regional and renewable energy, a lifestyle of voluntary simplicity, appropriate technology, and a rebirth of community, all within a bioregional context of human settlement should be societal goals. For Illich and Orr, this requires a total redesign of current educational systems. For Illich (1970), "deschooling society" is the desired plan of action. For David Orr (1992), it can be best manifested by working within the educational institution and substituting "ecological literacy" as the overall goal of education which can thus lead to sustainability. For Meadows, Meadows, and Randers (1992), the responsibility for ecological literacy or education for sustainability is as follows:

> It's time to do some truth-telling. The world's leaders do not know any better than anyone else how to bring about a sustainable society; most of them don't even know it's necessary to do so. A sustainability revolution requires each person to act as a learning leader at some level, from family to community to nation to the world. (p. 232)

An analysis of David Orr's definition of ecological literacy provides a framework for creating ecological literacy from the existing structure of agricultural education. Orr's position that ecologically literate persons should be competent with respect to where they live and how to live in their place supports the present capabilities of agricultural education to teach both mental and psychomotor based subjects. The diverse competencies required for ecological literacy are best characterized through the following goals for ecological literacy. Orr (1992) asserts that, "No student should graduate from any educational institution without a basic comprehension of":

1. the laws of thermodynamics,
2. the basic principles of ecology,
3. carrying capacity,
4. energetics,
5. least-cost, end-use analysis,
6. how to live well in a place,
7. limits of technology,
8. appropriate scale,
9. sustainable agriculture and forestry,
10. steady-state economics, and
11. environmental philosophy and ethics (p. 5).

These goals for ecological literacy education are applicable to the K-12 curriculum across all disciplines just as reading, writing, and mathematics can be taught as an integrated subject across the disciplines. Similarly, Orr recommends that environmental education be infused into the whole curriculum. The following suggests how this can be accomplished (Orr, 1992, pp. 135-136):

Discipline:	Environmental focus:
History	The effects of resource management, technological changes, effects of new sources of energy.
Ethics	The philosophical basis of sustainability; environmental ethics, animal rights.
Sociology	The structure of sustainability; values, behavior effects of overshoot (see Meadows, Meadows, & Randers, 1992).
Political Science	Politics as a resource distribution system; political structures of sustainability; balance between centralization and decentralization, freedom versus order.
Anthropology	Adaptive behavior of societies and cultures; alternative values; models of sustainability.
Economics	Steady-state economics, alternative pricing systems, alternatives to capitalism and communism.
Architecture	Design with nature, use of vernacular materials.
Biology/Agriculture	Ecosystems management, ecological agriculture, urban food systems.
World Order	Peace, sustainability, justice.

Environmental education has been an influence on the public education system since the 1970's. Resulting from this is a society aware of various threats to both humankind and the environment. Congruently, agricultural education has progressed from a primarily production focused curriculum to a contemporary agenda including production, literacy, science, and natural resources. Through such programs as Ag In The Classroom, Project Learning Tree, Project WILD, and Aquatic Project WILD, the complex issues of agriculture, society, and environment have begun to infiltrate into public education at all grade levels and in all subjects. The recent literature in global sustainability, most notably, David Orr's Ecological Literacy, provide widely accepted rationale for a new focus for education - sustainability. This education for sustainability can be developed from contemporary agricultural education, EE, and STS curricula.

An example of the diversification and incorporation of environmental education being recommended for agricultural education can be found in Pope (1990) who describes an agricultural literacy program known as "Project Food, Land and People." This program uses seven basic areas of agriculture to establish agricultural literacy goals which include: 1) basic food production, 2) historical development, 3) agriculture and the environment, 4) economics, 5) interdependent perceptions of food, land and people,
6) decision making, and 7) future global considerations in food, land and people (p. 8). These goals clearly demonstrate the adaptability of agricultural education to the concept of ecological literacy.

Implications for Agricultural Education

Linking agricultural education and global sustainability requires a new philosophy of education for not only agricultural education but education as a whole. Working with existing disciplines such as environmental education (EE) and STS, agricultural education could become a major factor in developing a new educational delivery system that yields ecological literacy. Cooperation among teachers, college faculty, educational agencies, and professional organizations will require significant efforts at all levels - from local to international. Simultaneous change within individual schools, teacher organizations, teacher education, state departments of education, and national organizations must occur from efforts at the grassroots level. By using the unifying theme of ecological literacy and global sustainability, educational institutions can then break the barriers inherent in existing curricula and subject matter disciplines and begin instilling sustainability ethics and values through the U.S. educational system.

Linking agricultural education and sustainability does not require a complete makeover of agricultural education. Contemporary elements and characteristics of agricultural education offer real promise of contributing to education for sustainability, herein referred to as "ecological literacy". Among these traits of agricultural education, agricultural literacy offers the greatest potential for expanding agricultural education into ecological literacy as described in the following quote from *Understanding Agriculture: New Directions for Education* (NRC, 1988):

> Agricultural literacy can be defined as possessing knowledge and understanding of our food and fibre system...[including] the production of plant and animal products, the economic impact of agriculture, its societal significance, agriculture's important relationship with natural resources and the environment, the marketing of agricultural products, the processing of agricultural products, public agricultural policies, the global significance of agriculture, and the distribution of agricultural products.
> (p. 8)

Whether teaching in or about agriculture, the type of agriculture discussed by agricultural educators is criticized by Berry (1977) and Jackson (1980) as being narrowly defined within its modern terms of production, efficiency, processing, and marketing. Currently, agricultural education is in most cases part of the bigger institution called public education. As such, agricultural education is seeking to redefine its purpose, curriculum, clientele, content, and policy. But in light of the individual differences between writers, preparation of young people to enter a world of work, business, and research is at the center of the educational philosophy. This paper argues that simply entering and maintaining the world as it is today, particularly in the industrialized nations, is simply not sufficient. For decades we knew no better; sustaining the American dream was considered virtuous and schooling allowed us to participate in the workforce. We now know better. The choice for survival and sustainability is ours to make.

A new philosophy of agricultural education should be broad visioned, contain most of the elements of today's environmental education and STS principles, and utilize appropriate technologies from today's agriculture and other pertinent pedagogical and policy standards. Additionally, a new philosophy should reflect the union of vocational and academic education. Ecological literacy requires the student to become competent at living sustainably which implies both affective and cognitive skills. Affective skills in this instance include the ethics being delivered, ethics recognizing limited resources (and their tolerance to destruction), growing populations, disproportional distribution of capital resources, a need for personal limitations, a re-evaluation of human work and self dependence, and a new sense of bioregional community. Cognitive skills would therefore include those required to sustainably produce human needs such as food, shelter, energy, and transportation. These skills represent the antithesis of the way human needs are currently met through industrialized production.

The infrastructure of modern agriculture, like other industrialized production, is unsustainable and damaging to both society and the environment. Transforming agriculture into a sustainable form would benefit from agricultural education teaching sustainable agriculture.

Concurrently, transforming an industrialized society into a sustainable form requires the entire educational system to teach ecological literacy. The tenets of sustainability and ecological literacy presented in this paper focus on a new form of agriculture, based on agrarian and organic principles of sustainability.

Sustainable agriculture represents an environmentally sound form of agriculture. In sustainable agriculture economic efficiency of agriculture is replaced with the long range health of the planet's resources as the primary goal. Similarly, Orr (1992) describes how all school curricula can be "environmentalized" by changing texts, activities, and including issues to reflect environmental concerns. As with other existing disciplines, agricultural education should incorporate environmental issues, curricula, content guidelines, and concepts into its curricula.

In addition to sustainable agriculture, agricultural education should begin the process of decompartmentalizing current curricula and lead the effort in developing curricula which is holistic, interdisciplinary, and place specific. Agricultural education should also cooperate with STS and environmental education to begin assembling ecological literacy curricula and programs comprised of former agricultural education, STS, and environmental education elements. The ecological literacy approach to education teaches students the impacts of industrialization and offers them the chance to learn about their place and how to live well in that place. It allows for issues to be dealt with in a holistic fashion, connecting students to the real world and actively engaging them in learning within their community.

In building bridges between agricultural education and sustainability, those involved in both teacher education and classroom teaching should play upon their interest in natural resources and environmental issues as a window to discovering ecological literacy. This can begin with a broad focus of agricultural education including teaching about global population, environmental degradation, and societal destruction. Adding history of the agriculture within agricultural education would provide a rationale for including agrarianism in the curriculum. Finally, allowing for discussions on current world and U.S. issues would enlighten students to the world outside their homes and schools.

A new philosophy of agricultural education might entail some of the tenets of agrarianism and bioregionalism. The following passage provides a new look at the concept of community and the potential roles schools promoting ecological literacy should play:

> A bioregional community is an identifiable geographic area of interacting life systems that is relatively self sustaining in the ever-renewing process of nature. The full diversity of life functions is carried out, not as individual or species, or even as organic beings, but as a community that includes the physical as well as organic components of the region. Such a bioregional community is self-propagating, self-nourishing, self-educating, self-governing, self-healing and self-fulfilling." (MacGillis 1991, p. 3)

Similarly, the Rodale Research Institute's (1993) "Regenerative" concept promoted in the magazine New Farm supports the bioregionalism emphasis. Regeneration is defined as "putting people, profit, and biological permanence back into farming..." (Rodale Institute, 1993, p. 1). Through the concept of regeneration, Rodale extends to agriculture, and other human activities, the quest for physical improvement of both the individual for doing the activity and of the resource for having been worked. The user and the used should both receive mutually beneficial fulfillment from the exchange. In regards to agriculture, Rodale asserts that human benefits derived from working with the land and using small scale, organic methods can provide this effect. But, as with bioregionalism, these ideals are very distant from those currently practiced in agriculture and taught through agricultural education programs.

The model of agrarianism which preceded virtually every industrialized society shows promise in returning our population to a sustainable future. Since it is within the realm of possibilities for agrarianism to epitomize ecological literacy and sustainability, and entail agriculture in its ultimate sustainable form, our current institution of agricultural education should seize these ideals and be their biggest supporter.

Agrarianism can, in the sense of agricultural development, define a new philosophy for agriculture and hence agricultural education. Whether characterized as appropriate technology, bioregionalism, agrarianism or back-to-basics, there are many who believe that a new societal structure is imminent and agriculture will be at the foundation of this change. Recognizing any restructuring will require that those with the most sacrifice most in terms of creature comforts and living a life separate from "work," and that they do this willingly.

Bioregionalism, as previously discussed, involves both knowing about one's region and how to live sustainably within that area. In this sense, bioregionalism reflects ecological literacy as applied to all facets of our lifestyles. Incorporating the philosophy of bioregionalism into the curriculum is especially appropriate for agricultural education. Orr (1992) proposes the following as a test for bioregional knowledge:

1. On what soil series are you standing?
2. When was the last time a fire burned in your area?
3. Name five native edible plants in your region and their seasons of availability.
4. From what direction do winter storms generally come in your region?
5. Where does your garbage go?
6. How long is the growing season where you live?
7. Name five grasses in your area. Are any of them native?
8. Name five resident and five migratory birds in your area.
9. What primary geological event influenced the land where you live?
10. What species have become extinct in your area?
11. What are the major plant associations in your area?

This list illustrates the diversity of subjects included in ecological literacy. The present incorporation of soils, plant identification, wildlife management, forestry, and natural resources in agricultural education offers an excellent base for expansion into ecological literacy. School greenhouses, land laboratories, agricultural mechanics facilities, and student projects provide the potential for teaching many of the aspects of bioregionalism contained within ecological literacy. Additionally, the current interest in agricultural science within agricultural education offers potential for adopting ecological literacy as its goal if the agriculture which is scientifically studied is in fact sustainable.

The overall parameters of a curriculum devoted to ecological literacy entail two essential dimensions. First is the historical context of one's place. By exploring local history through interviewing local residents, visiting museums, homesteads, graveyards, and so forth, students will learn history as it is impacted locally. Second, ecological literacy requires a virtually boundless study of the connections of the students, and their schools, homes, and communities with the surrounding world.

Orr (1992) offers a description of an activity which could eventually be expanded to include the spectrum of sustainable community living. The activity focuses on a subject relevant to the local school setting such as food, energy, industrial production, natural resources, or history. It ultimately attempts to link students, school, and place. In the activity, students focus on the food used within the school and trace its diverse origins back to the soil. What they immediately learn is "where did it come from?" But secondarily, they learn about agriculture, food processing, food distribution systems, and people. They also learn that very little of their food comes from local sources, even though the school may be located in an agricultural area. Ultimately, they study their school and its role within its place, and learn that the school has little connection with the local environment, except as a place to dispel wastes and support residents as employees while requiring road access (Orr, 1992, pp. 105-106).

Expanding this concept in terms of school curricula has potential for many extensions and applications. In replicating this activity with other inputs into a school such as energy, materials, equipment, teachers, and even the students themselves, the curriculum becomes a metadiscipline. Virtually all academic areas, a variety of personal skills, and history become inherently real. Learning becomes a task, a curiosity, a real thing as opposed to a segment within a teacher's planning book. As the interrelatedness of energy production, pollution, social issues, land development, and population are explored, education comes alive. Students are more likely to look at alternatives based on actual experience, thus the route to ecological literacy is opened and enhanced.

Sustainability implies a change in software--in people and lifestyles. Popularly referred to as "voluntary simplicity," sustainable living calls for a simpler, more active, and less consumer and energy dependent lifestyle. Ecological literacy requires that people be able to do the following:

1. Distinguish basic needs from wants,
2. Reduce dependencies,
3. Take full advantage of the free services of nature,
4. Use locally available resources,
5. Rebuild local and regional economies, and most importantly,
6. Rebuild strong, participatory communities (Orr, 1992, p. 161).

Lifestyles, dependencies, renewable resources, bioregionalism, community, and personal autonomy, in terms of agricultural education, could easily be adapted as outcome areas, or educational goals. Curriculum, if structure is necessary, could be loosely organized around these competencies. Connecting the student, school, and place would be the central theme. Incorporating ecological literacy into agricultural education, or education in general, requires a specificity to place. However, college educated teachers must be prepared differently so they can gain the skills necessary to know the place in which they will be living and/or teaching.

If agricultural and extension education can successfully address the issue of ecological literacy two benefits will result. (1) Agricultural Education in schools and in nonformal settings will attract more support because it will become more contemporary and more attractive to learners and decision makers (including politicians) at all levels. (2) Agricultural and extension education will regain its prominent role as a primary contributor to the sustainability of society. The focus of that contribution will shift from local, regional, or national societies to the emerging world society. Can any issue be more important than "global sustainability?"

David Orr (1992) has been the primary source used in the development of this discussion on agricultural education and sustainability, and appropriately, this paper closes with one of his thoughts:

> My primary concern is with the role education must play in the journey to a postmodern world. Education in the modern world was designed to further the conquest of nature and the industrialization of the planet. It tended to produce unbalanced, underdimensioned people tailored to fit the modern economy. Postmodern education must have a different agenda, one designed to heal, connect, liberate, empower, create, and celebrate. Postmodern education must be life-centered. (p. x)

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ENVIRONMENTAL CONCERNS IN RURAL PAKISTAN

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In recent years, people around the world have come to acknowledge the importance of the natural environment and its sensitivity to the effects of human activities. Most important has been the growing realization that the resources of water, soil, and plant and animal life constitute the natural capital upon which man depends to satisfy his needs and achieve his aspirations for development. The wise management of these resources, particularly in developing countries, has demanded positive and realistic planning that balances human needs with the potential the environment has for meeting them.

Pakistan is an agricultural country with a total area of 796,095 sq. km. Since its independence in 1947, the population has increased four-fold and was estimated at 117.32 million at the end of 1991. If the current growth rate of 3.1% per annum continues, the total population by the year 2000 may touch the 150 million mark. The literacy rate is estimated to have improved to 34% in 1991-92 from 26% in 1981. Agriculture is the main absorbent of the labor force (51.15%) followed by industry (12.69%) and trade (11.93%) (Survey of Pakistan 1991-92). As the population of Pakistan is increasing at a high rate, with slow growth in the literacy rate and intensive agricultural activities, the use of natural resources will continue to stress the environment.

Mardan Division is an important agricultural region in the North West Frontier Province of Pakistan. Most of the people in this division earn their livelihood in agriculture or agriculture-related industries. Major agricultural crops produced in Mardan Division are sugarcane, sugar beet, tobacco, wheat, maize, and a variety of fruits and vegetables.

Agriculture, in addition to being affected by air and water pollutants from other sources, is responsible for several types of pollution, most notably water pollution from farm animal wastes, eroded soil and agro-chemicals. Prahlad and Donald (1991) reported that agriculture is the source for 18.2 percent of air pollutant emissions in Hawaii. These are sulfur oxides, particulate matter, carbon monoxide, hydrocarbons and nitrogen oxide emissions (p. 279). Although farm animal wastes are valuable fertilizers when spread on the land, they can be undesirable pollutants if they find their way into waterways, produce serious problems of odor and sometimes transmit diseases.

Hodges (1977) noted that soil erosion by water or wind can transport soil and mineral particles into undesirable locations. Sediment in waterways have adverse effects on aquatic life and on the usefulness of the water to humans. Many pollutants that are not very soluble in water (for example, chlorinated hydrocarbons) can be transported into waterways by adsorption on sediments particles. Plant residues from crops and orchards can constitute environmental pollution when they harbor plant diseases and pests or when they are burned and emit smoke and hydrocarbons, because both situations correspond to an unfavorable alteration of the environment. Agricultural burning is a fairly important source of air pollution. Strong winds can carry soil particles and plant residues into the air and thus produce the air pollution problems associated with airborne particulate matter (p 245)

Tulloch (1972) stated that "many types of agricultural crops emit air pollutants while being harvested. Large combines harvesting small grain crops can often be seen for a considerable distance spewing forth clouds of dust and particles of vegetative material" (p. 11). Agricultural chemicals, whose use has increased dramatically in recent agricultural technology, can cause eutrophication when they are carried into waterways. High nitrate levels in drinking water are also very dangerous to infants. Mohamed and Istvan (1988) reported that "Nitrate contamination is linked to infant methemoglobinemia (blue-baby syndrome) as well as the formation of n-nitroso compounds which are etiologic agents for gastric cancer in humans" (p. 291).

The aerial spraying of the sugarcane crop in Mardan Division is a general practice for insect and disease control. As the population is congested and people are not aware of safety measures, this practice may be a hazard for human and livestock health as well as for natural predators and other useful insects. Gupta (1986) pointed out that cases of blindness, cancer, deformities, diseases of the liver and the nervous system from pesticide poisoning have been identified in cotton growing districts of two Indian states (p. 36).

Jeyaratnam (1980) reported that in Sri Lanka, an analysis of the 15,000 cases of poisoning admitted to the government hospitals of Sri Lanka showed that almost 79% of all cases of poisoning are due to pesticides (p. 24). Hawkins (1989) concluded that many Asian farmers have become accustomed to using heavy applications of highly toxic sprays which usually control the pests, but also kill natural enemies of the pest, increasing harmful insects populations (p. 48).

Sugar beet seed is usually fungicide treated. Farm laborers sow this treated seed manually and the chance for poisoning exists. Other crops are sprayed during the growing season with different insecticides which may have residual effects. FAO (1986) reported that there have been reliable reports of increased toxification of farmers using sprays without adequate protective gear, as well as increased resistance of some pest species to the sprays themselves plus environmental pollution caused by spray drift and heavy application leading to the poisoning of fish in paddy areas.

Seed corporations and farmers use insecticides and fumigate storage areas which may have a detrimental effect on the environment and human life. USDA (1991) stated in its yearbook, Agriculture and the environment: " Safe use of pesticides is difficult in the developing countries partly because these regions lack research, agricultural development programs and administrative capacity" (p. 135).

Waterlogging, salinity and soil erosion in Mardan Division may impair drinking water and soil quality. FAO (1979) reported that "of all the activities of man that influence the quality of ground water, agriculture is probably the most important; it is a diffuse source of pollution from fertilizers, pesticides and animal waste" (p. 63). Essam and Manzur (1988) reported that the most recent estimates suggest that the number of unintended acute pesticide poisonings in the world is of the order of one million cases per year with an overall percentage of fatality cases ranging from 0.5 to 2.0 (p.97). Whitters & Whitters (1978) state that, "the World Health Organization estimates that as many as 2 million people may die annually in India from diseases transmitted through polluted water (p. 18).

Agro-based industry is also increasing in Mardan Division using the raw materials produced in the agricultural sector. The expanding agro-based industries with no environmental regultions and accountibility, may also exert an adverse effect on the general environment.

Statement of the Problem

Although there has been little concern expressed, a number of factors are at work which may be influencing environmental degradation in rural areas of Pakistan. There is great pressure on farmers to increase production resulting from a rapid increase in population. Fragile soils are being farmed. Farmers, many of them illitrate, are using large quantities of chemical pesticides and fertilizers. Deforestation has left soils exposed to wind and water erosion damage. Years of overirrigation is causing salinity and waterlogging in some areas. And few restrictions are placed on agro-based industry to prevent pollution. With this situation in mind a study was designed to investigate the perceptions of farmers, researchers, extension

and agro-chemical sales personnel regarding environmental problems in agriculture of Mardan Division, North West Frontier of Pakistan.

Objectives of the Study

This study was designed to identify the major environmental problems in agriculture and the chemicals used in agriculture and their effect on human and animal life as perceived by farmers, researchers, extension workers and agro-chemicals sales personnel of Mardan Division. The objectives of this study were:

1. To determine the general awareness and concern of environmental issues associated with agriculture as perceived by farmers, researchers, extension and agro-chemical sales personnel
2. To identify the perceived major environmental problems in the agriculture sector.
3. To describe the perceived effects of agro-chemicals on the environment, and on human and animal life.
4. To describe the perceived role of agro-based industry in environmental pollution.

Method

In this study, the descriptive survey method of research using the inquiry form and interview was utilized. As can be noted in Table 1, the population for the study consisted of four groups of people involved in agricutural activities of Mardan Division:

1. The progressive farmers listed with the extension service in the Department of Agriculture. Using a random sampling, a total of 120 farmers (30 from each tehsil--an administrative unit) were selected for interview;

2. The available 40 agricultural researchers from three research institutes;

3. The entire group of 15 extension personnel, serving a unit of villages in each tehsil;

4. The available population of 28 agro-chemical sales personnel involved in the sale and distribution of agro-chemical in Mardan Division were interviewed. The survey form was developed keeping in view all the major environmental problems in agriculture of the Mardan Division. Content validity of the instrument was assessed by a panel of experts at West Virginia University. Internal consistency of the instrument was assessed by having Pakistani students in West Virginia University complete the questionnaire. Each group of subjects was asked the same set of questions regarding their perceptions of environmental problems associated with agriculture. As most of the farmers and some

agro-chemicals sales personnel were illiterate or did not understand English, they were interviewed and the questionnaire was filled out by the researcher according to their responses to each question.

The participants in the study were of different ages (77% were between 21 and 50) and educational levels. Of the total population, 14% never attended formal schools, 25% completed primary and 27% completed secondary level education. The remainding 34% (mostly researchers and extension personnel) were university graduates. They also have different language ability in Pushto, Urdu and English.

Results

Perceptions Regarding Adverse Effects of Agricultural Activities on the Environment: Data presented in Table 2 indicate that participants perceive the aerial spraying of chemicals, dead animals disposal, use of grain threshers, slaughterhouse waste disposal, and use of insecticides are the agricultural activities which have the most serious adverse effects on the environment. Farmers perceived 15 of the 25 agricultural activities less damaging to the environment than did other groups, while, in general, extension personnel considered these agricultural activities more harmful than did other groups.

Perceptions Regarding Severity of Selected Environmental Problems in Mardan Division: The most important general environmental problem perceived by the participants was air pollution (Table 3). Waterlogging, flooding, and surface water contamination were also considered somewhat serious environmental problems in Mardan Division.

Perceptions Regarding the Extent to Which Agro-based Industries Adversely Affect the Environment: The only agro-based industry perceived to have a considerable adverse effect on environment was the tobacco stem grinding operation (Table 4). Sugar mill operations, tobacco manufacturing and the tannery industry were perceived to be somewhat damaging to the environment.

Experiences of Participants Regarding the Extent to Which Selected Agro-chemicals are Commonly Used: The participants frequently experienced the use of 2-4-D, Malathion, Ripcord, Tamaron, Tribunal, Baythroid, and Diazinon. These seven agro-chemicals were used by participants more than the others. In every case, the farmers rated their use of agro-chemicals lower than did other groups.

Regarding the Extent to Which Selected Agro-chemicals are Considered Hazardous: DDT, BHC, Malathion, Tamaron, 2-4-D, Diazinon, Demecron, Baythroid, Furadon, and Thiodan were considered moderately hazardous to human and animal health by the participants. With the exception of BHC and DDT, farmers perceived that the agro-chemicals listed have no hazardous effects on human and animal health.

Perceptions Regarding Agro-chemicals Usage: Regarding safety devices, the participants seldom use/provide cloth masks, goggles, long boots, overall coats and never use/provide respirators during application of agro-chemicals. The participants usually follow the instructions shown on the labels of agro-chemicals during application but are less careful during handling, storing, and disposal. The participants never heard about/read about or observed agro-chemicals causing death but they believe agro-chemicals can cause illness. They also agreed that agro-chemicals adversely affect the bee keeping industry. They sometimes feel concern about general environmental issues and sometimes know the hazardous effects of agro-chemicals with which they work.

Receipt of Information Concerning Environmental Issues: The participants most frequently receive information regarding environmental issues from two main sources: television and newspapers. The other sources which occasionally provide environmental information were neighbors and friends, radio, professional colleagues, commercial publications and magazines. Scientific journals were only utilized by extension and research personnel. In seven cases out of the eight the farmers and agro-chemical sales personnel rated use of these sources lower than did the research and extension personnel.

Recommendations

Based on findings of the study the following recommendations were made:

a Agricultural and environmental literacy should be included in the curriculum of schools and colleges. Agricultural professionals as well as science and vocational teachers should receive training in environmental sciences.

b. Agro-chemical distributors and sales personnel should be required to undergo training provided by pesticides specialists prior to receiving a sale permit, and should be required to provide safety devices with chemicals.

c. Environmental Protection Agency of Pakistan should develop regulations to hold industries and other institutions accountable for environmental damage. Strict regulations for handling, distribution, storing, selling, and application of agro-chemicals should be enforced.

d. Further research in environmental issues and utilization of print and electronic media to educate the population are strongly recommended.

Educational importance

Agriculture contributes to environmental degradation particularly in developing countries like Pakistan, with a dense and growing population, low literacy rate, small land holdings and lack of environmental information and regulations. It is important to investigate and be aware of the perceptions of people engaged in agriculture regarding the environment because their lives directly impact and are impacted by it. The study will be helpful in documentation of environmental problems and stimulate action to include environmental information in extension programs as well as to promote further studies which will assist in making future agricultural policy.

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Table 1

Description of Survey Participants

Characteristics	Number	Percent
Position		
Farmers	120	59.1
Researchers	40	19.7
Extension personnel	15	7.4
Agro-chemicals sale personnel	28	13.8
Region		
Tehsil Mardan	67	33.7
Tehsil Takhtbhai	45	22.6
Tehsil Swabi	48	24.1
Tehsil Lahor	39	19.6
Age		
21-30	26	12.8
31-40	70	34.5
41-50	86	42.4
over50	21	10.3
Educational level		
Non-schooling	28	13.9
Primary	50	24.8
Secondary	55	27.2
University	69	34.2
Language ability		
Pushto		
Speak	203	100.0
Read	157	77.3
Write	74	36.5
Urdu		
Speak	134	66.0
Read	155	74.4
Write	94	46.3
English		
Speak	117	57.6
Read	143	70.4
Write	68	33.5

Table 2

Perceptions Regarding Adverse Effect of Agricultural Activities on the Environment

Agricultural activities	Overall Mean (N=203)	S.D.	Position Farm. (n=120)	Ext. (n=15)	Res. (n=40)	AgCh. (n=28)	F-value
Tillage operations	1.87	.91	1.93	1.62	1.65	2.04	1.57
Use of fertilizers	2.01	1.12	1.62	2.47	3.16	1.86	26.38*
Home food waste disposal	2.09	1.06	1.68	2.67	3.25	1.85	36.53*
Chemical seed treatments	2.22	.96	1.98	2.64	2.63	2.39	6.48*
Transportation of straw/plant residues	2.23	.82	2.30	1.80	2.10	2.35	2.23
Storing and application of farmyard manure	2.39	.93	2.40	2.53	2.38	2.26	.31
Overgrazing of grasslands	2.47	1.00	2.27	2.87	2.90	2.48	5.10*
Conventional threshing	2.48	.94	2.52	2.13	2.77	2.18	3.49*
Chemical transportation and handling	2.49	1.04	2.20	3.06	2.82	2.96	8.78*
Use of farm machinery	2.50	.92	2.48	2.26	2.43	2.82	1.54
Fumigation of grain storage	2.63	.97	2.40	2.93	2.92	3.04	5.78*
Chemical storage	2.85	1.03	2.61	2.80	3.18	3.43	7.02*
Tractor/trolly operations	2.86	.92	2.82	2.87	2.78	3.14	1.06
Hand spraying of chemicals	2.93	1.01	2.58	3.87	3.40	3.25	15.92*
Burning wood and plant residues	2.97	.88	2.78	3.33	3.25	3.15	4.57*
Use of rodenticide	3.06	1.14	2.92	2.92	3.23	3.46	2.12
Use of herbicides	3.07	1.12	2.76	3.80	3.45	3.35	7.82*
Chemical containers disposal	3.15	.93	2.85	3.67	3.57	3.57	11.98*
Use of fungicides	3.19	1.14	2.90	4.00	3.48	3.46	6.85*
Spoiled market fruit and vegetable disposal	3.30	.94	3.07	3.53	3.90	3.30	9.18*
Use of insecticides	3.53	1.14	3.16	4.27	4.08	3.96	12.59*
Slaughterhouse disposal	3.64	.81	3.56	3.33	3.74	4.00	3.19*
Use of grain threshers	3.67	.95	3.79	3.86	3.52	3.78	4.95*
Dead animals disposal	3.68	1.08	3.64	3.47	3.78	3.82	.51
Aerial spraying of chemicals	3.71	1.10	3.34	4.80	4.00	4.25	15.25*

* ANOVA Significant at .05

Rating Scale:

No affect	1
Very little affect	2
Some affect	3
Considerable affect	4
Very serious affect	5

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Table 3

Perceptions Regarding Severity of Selected Environmental Problems in Mardan Division

Environmental Problems	Overall Mean (N=203)	S.D	Position				F-value
			Farm. (n=120)	Ext. (n=15)	Res. (n=40)	AgCh. (n=28)	
Wind erosion	1.58	.83	1.28	2.14	3.31	1.48	23.09*
Soil contamination	2.05	1.07	1.60	2.87	2.92	1.86	24.24*
Ground water contamination	2.07	1.14	1.53	3.28	3.18	2.23	43.48*
Sedimentation	2.29	.92	2.12	2.86	2.39	2.39	3.06*
Deforestation	2.88	1.05	2.49	4.27	3.55	2.75	27.84*
Salt accumulation (salinity)	2.92	.97	2.50	3.67	3.77	3.04	28.30*
Water erosion	2.98	.91	2.98	2.80	2.85	3.25	1.33
Surface water contamination	3.08	1.13	2.65	4.06	3.59	3.68	18.63*
Flooding	3.15	.92	3.18	3.28	2.87	3.38	1.90
Waterlogging	3.33	.94	3.05	4.00	3.90	3.39	12.93*
Air pollution	3.69	.86	3.47	4.14	3.89	4.14	7.90*

*ANOVA Significant at .05

Rating Scale

Not a problem	1
Very little problem	2
Somewhat of a problem	3
Considerable problem	4
Very serious problem	5

Table 4

Perceptions Regarding the Extent to Which Agro-based Industries Adversely Affect the Environment

Agro-based Industries	Overall Mean (N=203)	S.D.	Position				F-value
			Farm. (n=120)	Ext. (n=15)	Res. (n=40)	AgCh. (n=28)	
Cooking oil processing	1.94	1.14	1.50	3.00	3.05	1.65	32.05*
Distilleries operations	2.06	1.10	1.51	3.00	2.63	1.37	19.54*
Detergents and soap making	2.15	1.16	1.76	3.00	2.84	1.43	16.30*
Flour mill operations	2.23	.93	1.96	2.73	3.02	2.00	19.19*
Tannery operations	2.56	1.04	2.36	3.21	2.63	2.80	3.50*
Tobacco manufacturing	2.97	1.11	2.64	3.47	3.52	3.33	9.88*
Sugar mill operations	3.21	.99	2.91	3.80	3.80	3.28	11.58*
Tobacco stem grinding	3.74	.87	3.76	3.20	3.52	4.22	5.96*

* ANOVA Significant at .05

Rating Scale

No effect	1
Very little effect	2
Some effect	3
Considerable effect	4
Very much effect	5

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SOCIO-ECONOMIC DIMENSIONS OF SUSTAINABLE AGRICULTURAL DEVELOPMENT: THE CASE OF PERI-URBAN AGRICULTURE IN TRINIDAD

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INTRODUCTION

Determinants of sustainable agricultural development can be categorized as physical, biological, production, and socio-economic (Ahmad *et al.*, 1991). While much emphasis usually has been placed on the physical and production aspects, the socio-economic underpinnings must be considered in dealing with this issue. Marshall (1985), in tracing the development of the peasantry in the Caribbean, stated that peasant were, in effect, "forced" to operate on marginal lands, and, in spite of some worthwhile land reform measures, this pattern still persists in many areas.

Much of the marginal areas occupied by small farmers consist of fairly steep hillside areas which are usually cultivated in root crops or vegetables. In any case, though, most of the islands are mountainous, and flat lands are at a premium. With the current thrust into diversification away from the traditional export crops, this pattern is likely to continue. The problem, of course, here is that it is more difficult to prevent soil erosion with the intensive cultivation of short-term crops than the longer term tree crops which are more extensive in nature. While a higher percentage of the land area of Trinidad is flat compared to its northern neighbours, 63% of that area is classified as unsuitable for agriculture according to a report by the Government of the Republic of Trinidad and Tobago (GORTT), (1987). Land distribution policies and programmes have also not been up to the task, a fact recognized by GORTT itself. For example, the 1988-1992 Agricultural Sector Plan (GORTT, 1987, p. 85) stated, "It is clear that a solution to the land tenure problem is urgently needed". The current draft plan for agriculture is also giving high priority to land matters.

There is hardly any doubt that all of this is directly associated with "land hunger" not only for agricultural lands but also lands for housing. Consequently, illegal occupation of state lands has become a national problem particularly since the downturn in the economy due to falling oil prices. The problem is especially acute in the periphery of the urban centres in northern Trinidad known as the "East-West Corridor" which are bordered by mountains on one side. The southern slopes in some areas are rapidly being deforested by persons seeking lands for housing or agriculture. While the actual areas under occupation may not be large, the attendant practices are seen as constituting a threat to the population centres not too far downstream. Fires used in land clearing almost invariably escape into nearby forests eventually destroying the forest cover which is important in maintaining the integrity of the aquifers. Additionally, soil and chemicals may wash into rivers and streams resulting in siltation and pollution.

PURPOSE OF THE PAPER

Although the broad parameters of "problem" briefly described above appear to be generally known, there is no recent work that have attempted to explore in some depth the dynamics of the situation. This paper reports on the socio-economic dimension of a study which examined peri-urban agriculture within a framework of sustainable agricultural development. It focuses on the following:

(1) "who" the people are i.e. age, level of education and other background characteristics;

(2) the degree of their dependence on agriculture as a source of income, food for the household and other purposes;

(3) land issues, e.g. forms of tenure, number of parcels;

(4) the policy environment relating to selected aspects of sustainable agricultural development.

METHODS

The sample, consisting of 144 respondents, was drawn from areas of concentrated hillside farming activity in peri-urban areas in northern Trinidad where the problem was felt to be most acute -- Santa Cruz, Maracas Valley, Caura and Lopinot. Personal interviews were conducted using structured questionnaires with appropriate open-ended questions to allow for exploration of important issues. Anecdotal evidence was collected on a limited basis to elaborate on information collected from the survey. Policy documents and other material was reviewed in relation to land issues.

RESULTS

I. The first set of results deal with the background characteristics of the respondents

Age. As the data below indicate, the largest proportion, that is close to half of the respondents, can be considered "middle-aged" but a fair amount are "young farmers". The distribution of the respondents according to age are as follows:

30 years and under	-	30 (21%)
31 to 50 years	-	69 (49%)
51 years and over	-	43 (30%)
Total		**142 (100%)**

Missing cases = 2

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Farming Experience. The respondents in general are a fairly experienced group, with almost three-quarters having over 10 years experience. The distribution of the respondents according to years of farming experience are as follows:

5 years and under experience	-	15 (10%)
6 - 10 years experience	-	23 (16%)
11 - 20 years experience	-	45 (22%)
over 20 years experience	-	60 (32%)
Total		**143 (100%)**

Missing cases = 1

Sex. The vast majority i.e. 90% of the respondents, are male.

Dependants. The highest proportion (44%) had one to three dependants, while a roughly equal group (43%) had more than four. The remainder (13%) had no dependents.

Highest Level of Education. The majority (64%) had primary education only while 28% also had secondary education. Nine percent had education beyond the secondary level.

II. The next set of results deal with the centrality of hillside farming to the livelihood of the respondents and the number of other persons who are also involved in farming.

Main Sources of Income. The vast majority of the respondents (94%) reported that hillside farming was an important source of income. Just over half of them (52%) reported other income sources such as pensions, "blue collar" and "white collar" jobs.

Assistance from Family Members. Just under half (47%) received assistance from family members in their farm operations. Twenty-eight percent received assistance from one or two persons and 19%, from three persons and over.

Hired Labour. Just over half the sample (55%) reported that they did not hire any labour. Of those who hired, most of them i.e. 34% of the sample, usually hired just one to two people on average.

Reasons for enterprise choice. By far, the most frequent response given related to economic considerations. The various responses and their frequencies are as follows:

Responses relating to potential for good income/availability of market/good prices	-	76 (53%)

Easy to manage/grow	-	46 (32%)
What they are accustomed to	-	26 (18%)
What is suited to the area	-	23 (17%)
Other	-	24 (17%)

(The total adds up to more than 100% since respondents were allowed to give more than one reason).

Disposal of produce. Information was sought on the amount of crops/livestock (a) sold to wholesalers; (b) retailed by themselves; (c) used at home and (d) used in other ways. A great majority indicated they sold more than two-thirds of their produce -- 60% sold it wholesale and 16% retailed it themselves. The importance of the produce for home consumption also, should not be overlooked. Eighty percent reported that they used less than one-third of their produce and 6%, more than one-third, at home.

III. The third set of results relate to land issues.

Total Sizes Held. The majority, 80 of the 144 respondents or 56%, have three acres or less, 26% have between 4 to 6 acres, while 18% have over 7 acres. Given this distribution, the respondents in general, can be regarded as "smallholders".

Number of Parcels. Information was sought first on the number of hillside parcels and second, on the number of other parcels, including the one on which they lived. Roughly three-quarters of the sample (76%) had one hillside parcel. Most of the others, i.e. 20% of the population had two parcels. With regard to other parcels, 42% did not have any other parcels; thus, they lived on their hillside parcels. Most of the others, i.e. 56% of the sample, had one other parcel.

Type of Tenure. The distribution of the respondents according to types of tenure under which their land is held is as follows:

Squatting only	-	61 (43%)
Squatting and owned	-	10 (7%)
Squatting and other	-	7 (5%)
Owned only	-	19 (13%)
Owned and other	-	3 (2%)
Other (rent/lease/used with permission)	-	43 (30%)
Total		**143 (100%)**

Missing cases = 1

Results show that squatting is by far the most prevalent type of tenure with 55% of the sample involved in this type of activity.

Length of time squatting. The findings do not show a clear bias in any particular direction; however it is remarkable that so many parcels have been squatted for over 10, and even, over 20 years. The length of time for which the various parcels have been squat are as follows:

3 years and under - 23 parcels (27%)
4 - 5 years - 15 parcels (17%)
6 - 10 years - 26 parcels (30%)
11 - 20 years - 12 parcels (14%)
over 20 years - 10 parcels (12%)
Total **86 (100%)**

Missing cases = 2

Sizes squatted. The findings indicate that, by far, small parcels, i.e. under three acres, predominate. The distribution of the squatted parcels according to size are as follows:

3 acres and under - 61 (69%)
4 - 5 acres - 19 (22%)
6 acres and over - 8 (9%)
Total **88 (100%)**

Extent to which "shifting agriculture" practised. The study sought to determine the extent to which a shifting form of agriculture was practised, that is, the extent to which people move to new lands over a period of time. Shifting agriculture, would most likely result in more damage to the environment than situations where persons operate within a fixed area, since it will involve a progressively increasing area cleared of natural vegetation. The vast majority of the cases, i.e. 84% of the respondents, indicated that they generally operate on the same parcel/s from year to year.

Finally, the paper now presents an overview of the type of operations and farming practices. The vast majority of the respondents are crop farmers; only 18% kept livestock. While vegetables were by far the most frequently occurring type of crop grown there was a great deal of interest in tree crops. Sixty-seven percent stated that they were very interested, and 23% fairly interested, in tree crops. Burning as a method of land clearing was used by 69% of the respondents although many acknowledged the dangers inherent in this practice. Fertilizers were used by 90% of the respondents and pesticides by 70%. In general, only a small proportion ranging from 15% to 25% used standard recommended soil conservation practices such as eyebrow terraces and contour drains. However, a lot of adaptations to those practices were evident e.g. logs/debris across the slope to trap materials that may wash down. Practices were generally carried out by hand.

CONCLUSIONS

The study reveals, first of all, that there are important socio-economic underpinnings to the issue of hillside farming in the areas identified. Most of the farmers and others perhaps who are directly involved in the operations, depend on income from such activities. Given the small sizes and difficult terrain in general, this would suggest that the incomes serve more to provide a livelihood, i.e. the basic requirements for living, rather than making them wealthy.

Another point to note here is one raised by FAO in a report on a mission in Trinidad (FAO, 1989). It claimed that agriculture was viewed as a "residual sector", that is, a last resort for employment. With the "downturn" in the economy due to the declining fortunes of the petroleum sector, more people appeared to have moved into agriculture. The findings of this study however, suggest that it has not been a large scale movement of "novices" since the majority had a fair amount of experience in agriculture. Rather, it may be a case of people returning to agriculture as follow-up discussions with one respondent revealed. He had bought two lorries for his sons in the "oil-boom period" but these had to be sold and they were back on the farm with him. In general, therefore there seems to be an issue of economic need if not, abject poverty that plays a significant role in hillside farming.

The paper has already cited the phenomenon of "land hunger" in Trinidad common to many developing countries. The problem is perhaps more critical for housing but similar considerations apply. The enormity of the problem is illustrated in a recent newspaper article (Lights, Water for Arima Squatters, 1993) which reported the Minister of Housing and Settlements saying "there were about 50,000 households with about 200,000 squatters, 75 percent of whom were in the East-West Corridor." Successive governments, because of the politically sensitive nature of the issue, have taken positions ranging from turning a "blind eye" to the issue or at best, taking a sympathetic view (see for example, GORTT, 1987, p. 85). This has culminated in squatter regularisation programmes largely funded by the Inter-American Development Bank (IDB) which aim at providing legal tenancy and infrastructural facilities in the areas.

The general policy framework can thus be regarded as encouraging "squatting" since people will tend to occupy areas with the expectation that it will be given to them at some time. This is apparently a factor operating in the areas under study since as the findings show, the most frequently occurring form of tenure was squatting, which in many cases, had been going on for a relatively long time. What can be considered a positive aspect is the tendency to stick to a fixed area rather than move from place to place to have a stronger claim to a particular spot.

The problem of squatting is complex; however, ambivalence and procrastination will only exacerbate the problem leading to situations such as that which now exists in the Nariva Swamp, a protected wet lands area -- people may squat in areas that should be best left alone in the national interest. As discussed, too, hillside farming could also pose hazards especially given the finding that the tendency is to grow short-term crops.

Resettling has been proposed sometimes as a solution. However, certain factors need to be taken into account. First, where people have been occupying an area for a long time, they are likely to establish "roots" and thus, they may want to resist relocation attempts. Second, as experience has shown (Narinesingh, 1993; Sooknanan, 1993) hillside farmers prefer to move to hillside areas similar to what they have been accustomed. If they have no experience farming on flat lands, they tend to have problems adjusting to the new situation. There is also the question of marketing. Hillside farmers can grow vegetables in the "off season" i.e. the wet season, when lowland farmers may have difficulties due to flooding.

EDUCATIONAL IMPORTANCE

The study illustrates, as Farming System Research and Extension advocates, the need to take a holistic approach in dealing with problems facing "small" or "low-resource" farmers. Clearly the "problem" studied is multi-dimensional requiring action on several fronts. Efforts to come up with land policies sensitive to the socio-economic context must be intensified; effective implementation must also be emphasized. On hillsides, agro-forestry or tree crop cultivation will be the best bet. However, this assumes a fairly secure form of tenure given the long-term nature of the crop, and large enough acreages to provide the possibility of good economic returns. There are also marketing issues - the existence of reliable markets and the flexibility of the enterprise to respond quickly to changes in the market.

In the case of burning, there is legislation, which if effectively enforced can mitigate the problem; however, lack of adequate manpower has plagued the agencies responsible. There also seems to be cause for optimism with regard to educational programmes since the respondents appeared to have acknowledged the dangers inherent in the practice. Extension and Research, could also play an important role by promoting more environmental friendly technologies such as mini-terraces and contour drains and banks. It would appear, too, that greater attention should be given to some of the practices they currently use with a view to upgrading them, if possible, to do an effective job. Crop selection can also help. The feasibility of the use of crops such as christophene, which, though not long-term, provides a good ground cover, should be explored.

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Arresting Deforestation in the Amazon

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Introduction

Deforestation is one of the major environmental issues of our time. The impact of deforestation in the Amazon has been heavily publicized and discussed. The most widespread practice that has led to deforestation among all Amazonian countries is cattle ranching (Hecht, 1981). Cattle ranching remains the dominant land use in the Amazon Basin because of: (1) its low labor intensity compared to raising crops, (2) government incentives, (3) high rates of inflation, (4) an increasing demand for beef, (5) a stable price for beef, and (6) the maximization of short term gains (MacLean-Stearman, 1983; Fearnside, 1985; Hecht et al., 1988; Browder, 1988). If future deforestation is to be prevented, two questions must be answered. Is deforestation inevitable for cattle ranching? What alternatives can be offered to ranchers to counter deforestation?

Purpose of the Study

In order to answer those two questions, the purposes of the study were to determine how cattle farmers manage their resources (land, cattle, labor), to evaluate their present practices, and to make appropriate recommendations. The objectives were: (1) to describe practices and attitudes of cattle farmers in Morona Santiago, Ecuador related to management of land, cattle, and labor; and (2) to identify specific steps to improve the cattle ranchers' resource management and production efficiency.

Site Selection and Description

Morona Santiago, Ecuador was selected as the study site because of its location in the Amazon, its widespread cattle industry, and because of one of the researchers' familiarity with the region. Morona Santiago is one of the five provinces located in Ecuador's Amazon Region and is the leader in cattle production among the five provinces (CREA, 1988). Cattle ranching is the primary economic activity in the province which occupies 90% of the forest areas cleared for agriculture or roughly 338,900 hectares (SEAN, 1991). CREA (1988) estimates that 225,000 head of cattle are present in the province. The major effects of cattle ranching in the province have been deforestation and the depletion of soil resources.

Method

A purposive sample of 44 individuals involved in cattle ranching in the area was selected for interviews. A random sample was not possible due to constraints including distances, accessibility by existing roads, lack of information on the total population, expense, and the farmers' unwillingness to divulge information to strangers. Selection criteria for 37 of the 41 ranchers included in the sample were: (1) physical availability, (2) a willingness to participate in the study, (3) farm size of 50 hectares or less, (4) herd size of 50 head or less, (5) cattle production was the main income activity, (6) the rancher or his family directly cared for the cattle on a daily basis, and (7) the rancher owned the land. The remaining four ranchers were selected because they were participating in an agroforestry project sponsored by CREA-DDMS, a governmental agency similar to agricultural extension. These four ranchers were interviewed to compare their resource management practices to the other ranchers who utilized the "traditional" system (animals are tie grazed, little preventative health is practiced, feed supplements are administered sporadically or not at all, genetic advancement is lacking, management is labor intensive, and agency assistance is lacking).

The last three members of the sample were the director and two employees of CREA-DDMS. They were interviewed for their assessment of the problems facing the ranchers and for their recommendations. All members of the sample were selected by one of the researchers who was familiar with the area and the population after investing three years in Morona Santiago as a Peace Corps Volunteer specializing in livestock problems of small-scale ranchers.

Data were collected using a cassette tape recorder and a descriptive survey instrument developed by the researchers. The instrument consisted of 49 questions divided into five sections: (1) background information on the rancher, (2) land management practices, (3) cattle management practices, (4) amount and type of labor used, and (5) sources of knowledge and technical information.

Results

Land management basically deals with pasture grasses and trees. Most of the ranchers (80.5%) had deforested greater than 70% of their land for pasture. Three grasses, shown in figure 1, were grown.

Figure 1. Pasture Grasses Used

Grass	Head/hectare	Regrazing Time in Months
Imperial (Axonopus scoparius)	1.0	7.2
Elephant (Pennisetum purpureum)	2.2	3.5
Setaria (Setaria sphacelata)	3.7	1.7

Imperial grass was the most common pasture used (95.1% of the ranchers), yet this grass was the least productive and very time consuming to maintain. Setaria, a relatively new grass in the area, was used by a minority of the ranchers (31.7%). However, these ranchers reported that setaria grass is easier to maintain, does not decrease in quality or quantity over time (with proper management) as the other grasses do, and does not degrade the soil. The reasons for the reported differences between these grasses will be explained in the following paragraphs.

Imperial and elephant grasses had a long regrazing time since they were predominately grazed in a reproductive stage, while setaria had a much shorter regrazing time since it was grazed in a vegetative stage. Imperial and elephant grasses were not grazed during the vegetative stage to avoid problems such as poor intake of the grass, pasture depletion, and diarrhea. On the other hand, these problems did not occur with setaria grass, thus it was grazed during the vegetative stage to prevent a decline in nutritional quality. Cattle ranchers reported that maintaining imperial and elephant grasses in a productive state was a very time consuming process since weeds and secondary regrowth were cut back manually on a daily basis to guarantee pasture survival and longevity. Ranchers utilizing setaria grass did not encounter these problems, therefore no maintenance was required to keep setaria in a productive state.

The production declines of imperial and elephant grasses and the more stable production levels of setaria grass can be explained by the three grasses' shade tolerance. Imperial and elephant grasses have a very low shade tolerance growing best in open areas, while setaria grass grows best in well shaded areas, figure 2.

Figure 2. Pasture Preference to Light Intensity

Grass	Open Areas %	Partially-Shaded %	Well Shaded %
Imperial	66.7	33.3	0.0
Elephant	57.9	36.8	5.3
Setaria	0.0	15.4	84.6

Because of imperial and elephant grasses' low shade tolerance, ranchers reported leaving very few trees in their pastures. Given the average age of these pastures (20 years), and the lack of trees, their yields would be expected to decline (due to soil degradation) in the absence of inputs such as fertilizer or nitrogen fixation, as described by Sanchez and Salinas (1981) and Fearnside (1980).

Since setaria grass grows best in well shaded areas, the potential for planting trees exists. All ranchers reported leaving trees standing for purposes such as shade, lumber, and firewood when establishing a new pasture. However, only four ranchers, those working with CREA-DDMS, were actively planting trees in conjunction with setaria grass. Their principal reasons for planting trees were for nitrogen fixation, living fences, forage, and lumber.

Cattle management mainly consisted of tie-grazing the cattle. The main reasons reported for tie-grazing were: (1) to prevent pasture damage and eventual loss, (2) since it was customary, and (3) since no fences were in place to restrain the cattle. Only two of the 41 ranchers maintained their cattle loose within fenced pastures of setaria grass. These two ranchers provided salt, water. and minerals free choice. The other ranchers provided these necessities sporadically if at all. Less than 50% of the ranchers treated their cattle for internal parasites. Only 30% of the ranchers kept any records at all.

Labor management for the two ranchers using setaria grass and fenced pastures was relatively easy. For the other ranchers labor intensity was much higher since the cattle had to be moved frequently and the pastures maintained by cutting back secondary growth and weeds on a daily basis. Salt, water, and minerals had to be administered directly to each animal.

Technical assistance received from government agencies was nonexistent for 88% of the ranchers. For most ranchers technical assistance came primarily from family members or neighbors. Only the four ranchers working with CREA-DDMS reported assistance from a governmental agency. These four were satisfied with their current production systems while 78% of the ranchers were not satisfied. The most common changes desired were to improve the pastures and the breed of cattle.

Conclusions and Recommendations

The researchers concluded that the "silvopastoral system" being tested by CREA-DDMS and the four ranchers should be implemented on a wide scale. This system includes (1) planting fast growing, shade tolerant grasses such as setaria or dallis grass (Paspalum dilatatum);
(2) planting leguminous trees to allow for live fences, nitrogen fixation, improving soil physical properties, providing for shade, and allowing for diversification of production; and
(3) implementing a rotational grazing program where parcels could be rested and regrazed to improve pasture production and reduce soil compaction.

To supplement this system the researchers recommended other management steps including (1) free access of cattle to water, salt, and minerals; (2) regular deparasitation;
(3) animal treatment areas and restraining chutes to make treatment easier; (4) record keeping;
(5) proper calf care practices; (6) regular weight estimation using a tape measure; and
(7) introduction of better quality reproductors into the herds. These steps should be implemented with the support of CREA-DDMS, Peace Corps Volunteers, and The German Agency for Social and Technical Cooperation, agencies that are already working in the Province but could strengthen their efforts through cooperation.

Educational Importance

The silvopastoral system and the recommended management steps have already been introduced on a small scale in Morona Santiago. The practices are appropriate for the ranchers, economically feasible, culturally acceptable, environmentally sound, and can arrest deforestation in Morona Santiago. If ranchers can more efficiently use their existing pastures, they will have less pressure to clear new parcels for pasture. The researchers have also observed other sites in the Amazon Basin (in Ecuador, Bolivia, and Brazil). They believe that this silvopastoral system, or a variation, has the potential to arrest deforestation in these areas as well. For other areas outside Morona Santiago, the researchers recommend the same process of small scale introduction, evaluation, adaptation, and diffusion by cooperating agencies.

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Session F RESEARCH TO FARMER LINKAGES

1. **Pesticide Use Information Flows and Competencies of Public Extension Agents in Zimbabwe**
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2. **Technology Transfer and Adoption by Small African Farmer: The Role of Research and Extension Education**
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PESTICIDE USE INFORMATION FLOWS AND COMPETENCIES OF PUBLIC EXTENSION AGENTS IN ZIMBABWE*

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**This paper draws mainly from the author's doctoral dissertation from Michigan State University titled "Pesticide Use Information Flows and Competencies of Agritex Extension Agents in the Midlands and Mashonaland Provinces of Zimbabwe."*

Introduction

The efficient use of technology by small-scale farmers requires support from agricultural service institutions. There is a limited knowledge base on the technology transfer systems of agricultural extension organizations in developing countries. Specifically, little is known about the interaction of the organizational system, in terms of communication and information flows, and, the technical competence of extension agents. External technology like pesticide use is developed and marketed by multinational corporations with minor obligations to neither small-scale users nor the extension system. The major extension organization in Zimbabwe, Agritex, is based in government ministry of agriculture. Typical of large agricultural extension organizations in Sub-Saharan Africa, Agritex is a publicly-funded bureaucracy with a top-down management style. Only a small portion of the organization's budget is available for extension activities. Agritex faces growing pressure for limited resources. There is need for an empirical examination of the relevance of Agritex's extension programs and the organization's ability to undertake various aspects of extension work adequately. The effectiveness of Agritex's extension programs is dependent on the quality of service provided by its extension staff for specific farmer needs. A number of factors contribute to the extension agents' ability to meet these needs. This paper summarizes research done by the author in Zimbabwe. The research addressed the issue of extension agent competence, and also the interactions between public and private extension institutions with respect to agricultural technology.

The major research questions were:

1. What are the technical competencies of Agritex extension agents regarding pesticide use?
2. What sources and channels are used to disseminate technical information related to pesticide use within Agritex?
3. What are the attitudes of Agritex extension agents toward pesticide use?
4. What are the technical support needs of Agritex field extension agents regarding pesticide use management?

Methodology

The study used a descriptive research design. Primary data was collected from selected Agritex extension agents using a self-administered questionnaire. The instrument, which was developed from the research questions and hypotheses, was tested for validity and reliability before administration. It was also pilot tested on a group of similar respondents. The questionnaire consisted of four sections: competence in pesticide use, information sources and channels, attitudes to pesticide use, and lastly, demographic characteristics. The questionnaire was administered by the author or the respective Agritex extension officer for the district. The usable sample consisted of 209 respondents from Midlands and Mashonaland Central provinces. Data was analyzed using SPSS PC+ Version 4.0 software.

Study Findings

At the .05 level, there were no significant differences found between the two provinces in terms of respondent demographic characteristics and competency scores.

The total sample size was 209 extension agents from the 2 provinces. Most respondents (81.6%) were extension workers; the rest were extension supervisors and senior supervisors (7.7%), and officers (10.7%). Females made up about 10% of the sample, which is similar to the proportion of females nationally amongst Agritex field extension staff. The average age was 39 years, although average for female agents was 10 years lower. Over half the respondents had at least 11 years of formal school. Four of the officers had university degrees. Thirteen of the respondents, all males, had the lowest academic qualifications (<7 years). All respondents had at least 2 years of post-school agricultural training, with the majority (92%) being agricultural certificate holders. The average length of service in Agritex was 13.7 years, with a wide range of 38 years. Forty-six percent of the respondents had worked for less than 10 years in Agritex. There was a high incidence of correlation between the demographic variables.

Extension Agent Technical Competence

The operational definition of technical competence was the extension agent's score in three task performance areas in the questionnaire. These task performance areas were pesticide application skills, knowledge of recommended products for specific pests and crops, and, general pest management. Self-assessment was used for measuring the pesticide application skills; 72% of the extension agents considered themselves capable of various application skills. An average of 60% of the agents provided correct responses to pesticide product knowledge questions; the average for general pest management questions was 64%. About 20% of the extension agents referred to banned or withdrawn pesticide products in some of their responses indicating a general unawareness of the registration status of some pesticides.

Semi-partial multiple regression was used to test for the significance of variables in three general areas: demographic characteristics, training and access to information. At the .05 level the three variable sets were significant.

Using stepwise multiple regression, the following independent variables were identified as influencing the competency score: the extension agent's age, gender, level of in-service training, contact and use of pesticide company sales representatives as information sources. Age was negatively related to the technical competence; younger agents scored significantly higher than older agents. The extension agents' years of employment in Agritex was highly correlated with age and was consequently removed from the regression equation to minimize multicollinearity. Female extension agents had significantly higher scores than males. The level of in-service training, contact and use of sales representatives had positive relationships with the dependent variable. There were no significant relationships between the extension agent's formal qualifications or their rank in Agritex, with technical competence. The independent variables in the regression equation explained about 31% ($R^2 = .305$) of the variance in extension agents' competency scores.

Information Sources and Channels

Extension agents used a variety of sources for pesticide use information. The main sources listed were Agritex, pesticide company representatives and dealers, printed materials, pesticide-product labels and mass media. Radio and surprisingly television were the most frequently mentioned mass media sources. Both Agritex officers and sales representatives were considered as important sources of pesticide use information, with the latter being perceived as significantly more important than the former.

Formal channels, like Agritex officers and sales personnel, were used more than informal ones like mass media. Media richness, the capacity of an information medium to facilitate communication, had no significant effects on the use of the various information channels tested. About half the extension agents had at least one contact with a pesticide company representative in the preceding year. The frequency of contact was similar to the market shares held by the pesticide companies in the small-scale farmer pesticide market.

There were some relationships between the use of some pesticide information sources and channels, and, demographic characteristics. At the .05 level, there was a significant relationship between the use of radio as a channel for pesticide information and the age of the extension agent, and, the highest academic qualification attained. Older extension agents used more informal channels than younger agents. There were no significant relationships between demographic characteristics and the use of Agritex officers and publications, sales representatives, newspapers and magazines, farmers, television, and, the demographic variables. Extension supervisors had greater access to lean media sources than extension workers.

Extension Agent Attitudes toward Pesticide Use

Respondent attitudes were assessed using a Likert-type scale for responses to various statements related to pesticide use. Extension agent attitudes were generally favorable to Agritex, pesticide companies and representatives, and pesticide use information and knowledge. Extension workers felt that they are not contacted by both Agritex officers and sales representatives for technical information. Attitudes to small-scale farmers, as sources of pesticide use information were generally unfavorable. Most extension agents did not consider small-scale farmers as useful sources of pesticide use information. They felt that most farmers in their respective work areas did not know how to use pesticides correctly. Most extension agents were favorable to having the responsibility for small-scale farmer training in pesticide use. There were no significant differences in attitudes with respect to the following extension agent demographic variables: age, gender, formal training, position and years of service in Agritex.

Extension Agent Technical Support Needs

Most of the extension agents sampled are requested to provide advice on pesticide use by farmers in their respective work areas. The majority have conducted training sessions in pest control for farmers. Extension agents undergo limited pre-service training related to pests and pesticide management. Agritex faces a number of constraints in training extension agents. Less than 4% of the department's budget is allocated for staff training.

While the Training Branch offers a variety of in-service courses, only one relates specifically to pesticide use. There is very little formal training provided for Agritex extension agents by the pesticide companies. Specific areas in pesticide use for which the extension agents requested more training or information were pesticide safety, calibration and product information. The amount of print materials and other aids related to pesticide use are limited. Provision of information on pesticide use is neither systematic nor comprehensive. Most extension agents do not have a readily available source of technical information. While the registration system specifies the items of protective clothing for use with various pesticide products, field extension agents usually do not have access to most items of the required protective clothing.

Within the small-scale sector, most of the company representatives in contact with extension agents are salespersons. Contact between company representatives and extension agents is usually informal and related to marketing activities. In principle, companies are supportive of increased training of Agritex agents. Financial considerations in this sub-market limit the extension activities of marketing companies. Pesticide companies and other private organizations are unlikely to make long-term commitments for training Agritex extension agents.

A number of respondents raised concerns about the limited availability of pesticide information in print form. There were also concerns about the possible sale of expired products by marketers in the small-scale farming sector. Some extension agents suggested the greater use of the vernacular language for pesticide information, and, specifically product labels. There was a request for the supply of protective clothing for all extension workers.

CONCLUSIONS AND IMPLICATIONS

Agritex

There is wide variance in the technical competence of Agritex agents. Extension agent technical competency is influenced by demographic characteristics, training and access to technical information. To improve the technical competence of its field extension agents, Agritex needs to develop more specific policies with respect to all three areas.

The age and gender of extension agents are key demographic characteristics explaining the variation in technical competence. Older agents are less technically competent than their younger counterparts. Female agents are more competent than males. The proportion of female extension agents in Agritex is still very low. The limited evidence from this study indicates that the policy of recruiting female students into agricultural colleges and subsequently into Agritex, has had positive effects and should be increased to reduce the disparities in gender representation in the organization.

Extension agents' technical competency with respect to pesticide use, is not related to formal academic and agricultural qualifications. Due to the tremendous increase in school enrolment since 1980, the demand for places at agricultural colleges and consequently Agritex, is likely to remain high. As the major employer of agricultural college graduates, Agritex should have greater input in the programs offered at these institutions. Increasing the entry level academic qualifications for the agricultural certificate institutions may be shortsighted since there seem to be no major differences in extension worker technical competence related to formal qualifications. Increasing the entry-level academic qualifications for extension workers may also disadvantage students from the relatively less-endowed rural schools, despite their greater familiarity with small-scale agriculture.

In-service training is positively related to extension agent competence. There is a need for regular, systematic evaluation of Agritex training policies and the specific courses that the extension agents attend. Though Agritex in-service training will not correct for gaps in basic extension agent training, opportunities should be provided for outstanding extension workers to pursue formal training. The limited career opportunities for lower-level extension staff can only serve to further increase frustration and de-motivation given the arduous nature of rural field work and the generally poor conditions of the public service.

Extension agents use a wide variety of sources for obtaining pesticide use information. Agritex, pesticide company sales representatives and printed materials are the three most frequently used sources. The flow of information is essentially one way: from external sources or technical officers in Agritex, to field extension workers. Extension agents perceive sales representatives as more credible sources of pesticide information than Agritex officers. Mass media sources and farmers are used less frequently. Older extension agents make greater use of the radio for acquiring technical information than younger agents. Formal channels are used more than informal ones in acquisition of information. Media richness had no influence on the use of information sources and channels. There is potential for greater use of mass media for pesticide-use education. Consideration should be given to developing or recruiting mass media professionals to improve the current use of these channels. This could be facilitated by formal cooperation policies between Agritex and the mass media organizations.

Extension agents consider the use of pesticide as an important aspect of their jobs. Their attitudes toward Agritex, pesticide companies, and acquiring more knowledge on pesticides are favorable. They have unfavorable attitudes towards small-scale farmers as potential sources of pesticide use information. This result is rather surprising given that some communal farmers in the survey area have been using pesticides for decades, suggesting that they are likely to acquired some expertise through this long experience. There was limited evidence to allow for more specific conclusions on extension agent attitudes to small-scale farmers. Extension agent attitudes to pesticides and their use are not influenced by demographic characteristics. Assessment of specific relationships between Agritex extension agents and small-scale farmers were outside the scope of this study. There is need for empirical evaluation of extension agent attitudes to small-scale farmers to assess whether the unfavorable attitudes of extension agents found in this study are limited to pesticide use or extend to the broader aspect of farmer knowledge. Insights into extension agent-farmer relationships would allow for more enlightened policies aimed at increasing the mutual benefits from extension agent-farmer interactions.

Technical support, both from within and outside the organization, available to Agritex field extension agents for pesticide management is generally inadequate and irregular. The quality of farmer training by extension agents is affected by shortages of teaching aids including protective clothing and printed materials like books, pamphlets and posters. Extension agents indicated a need for more regular and comprehensive training in pesticide use especially in the areas of application skills, safety and product information. Agritex has limited capacity for correcting knowledge gaps due to inadequate pre-service training. In this respect there is a need to incorporate pest management courses in the curriculum of agricultural training institutions.

The resource limitations facing Agritex require a critical evaluation of the role of public agencies in the provision of extension services. The key policy issue is whether public or private sector organizations should be responsible for providing technical support. In the more productive areas, there may be opportunities for formal involvement of pesticide companies in providing technical support, with Agritex playing a monitoring role.

Pesticide Use Regulations

The pesticide registration system in Zimbabwe is generally sound and comparable to systems in more developed countries. There are however some inadequacies which are partly due to the opening up of the country's economy and limited resources within the registration agencies.

Specific concerns relate to the importation of pesticides by individuals and non-traditional organizations, which will entail greater scrutiny by the registration agencies. The criteria used for screening applicants for pesticide registration has to include the capacity to handle the potentially dangerous side effects of pesticides, over and above product efficacy. With more liberal economic policies, there is growing interest in direct importation of pesticides by commodity groups and individual farmers. These groups are likely to be less knowledgeable and/or concerned about the potential hazards of pesticides.

Monitoring of field activities related to pesticide use is generally informal and has traditionally been based on the goodwill of pesticide companies and other NGOs. The ability of the registration agencies to conduct post-registration activities is imperative. For example, some of the extension agents sampled for this study claimed that expired pesticides are sometimes sold in the small-scale sub-market. The public regulatory agencies, have limited capability for field monitoring and enforcement. However there is still a need for these public agencies to act as neutral evaluators of issues like product quality in the market, compliance with regulations like labelling, and, training programs specific to various categories of pesticides. With increasing numbers of marketing organizations, products and applicators, the need for more stringent regulations is critical.

The linkages between these regulatory agencies and Agritex are minimal. Agritex has little involvement in the registration, regulation or monitoring of pesticide use. There is negligible contact between pesticide company technical specialists and Agritex extension agents; there is relatively more contact between company sales representatives and extension agents. Contact between sales representatives and extension agents is usually based on informal relationships in the field. Extension agents expressed interest in interacting with pesticide company representatives for technical aspects of pesticide management.

RECOMMENDATIONS

Given the resource constraints facing Agritex, it is unlikely that the organization will be able to increase the number of extension programs/activities it is involved in. There is a need for Agritex to reassess its role in the agricultural system given that it is not feasible to provide adequate support for all communal area farmers. At the policy level, the decision-makers in the organization need to address the key question of whether or not Agritex should be actively involved in the pest management system. The recommendations for Agritex are provided on the assumption that it will remain as the main supporting organization for advising small-scale farmers on pesticide use management.

To accommodate the perspectives, interests and needs of the diverse organizations and personnel involved in pesticide management and use, the recommendation section is divided into the three main categories of pesticide use information users: Agritex, the monitoring and regulatory agencies, and pesticide companies. Within each section, the recommendations are divided into general and specific categories. This structuring is meant more for placing the issues into context, rather than to portray pesticide use information management as consisting of sets of self-contained entities. These user-categories are all part of a dynamic system in which each unit affects the total performance of the whole.

Effective use of agricultural technology requires knowledge on the part of users and advisers. Increased use of agricultural inputs also entails a greater demand for more, and specialized technical services. Small-scale farmers are likely to make more cost-effective use of pesticides if the knowledge levels of the extension agents advising them increases. The philosophical orientation of Agritex's extension system needs to emphasize knowledge and its acquisition, rather than the traditional notion of viewing extension agents as message carriers. Agritex will benefit from investing in the technical knowledge of its field staff. Extension agents will benefit if Agritex is a more active participant in the pesticide management system. This would not only improve the awareness and knowledge of senior Agritex staff of the relative sophistication and intricacies of the pesticide industry but also bring to the fore, problems associated with pesticide use amongst small-scale users. Benefits from investing in technical knowledge will be realized if the organization promotes an atmosphere for professional activities and behaviors.

Agritex

To enhance the technical know-how of extension agents, Agritex needs to develop closer links with the agricultural training institutions. Agritex needs to focus on increasing the awareness of the trainers in these institutions of the skills required of potential Agritex extension agents. Specifically, the curriculum used by training institutions should put more emphasis on agricultural pests and pest management. This is a necessary requirement given the need to address the environmental aspects of small-scale agriculture and the limited capability of Agritex to correct for knowledge gaps in pre-service basic training. Because of the positive relationship between in-service training and technical competence, training in pesticide use should be obligatory for all extension agents who are directly involved in advising and training farmers. Specifically, the Agritex course on the safe use of pesticides should be mandatory for all field extension staff. Agritex should also facilitate training and informal linkages between its extension agents and other organizations.

Monitoring and Regulatory Agencies

More stringent regulations are required to reduce the likelihood of registering products from organizations with inadequate capacity to handle the potential side-effects of pesticide manufacturing and marketing. For the small-scale farming sector, there is need for introducing additional requirements for pesticide products with potential use in this sub-market. Such regulations could include requesting that applicants for product registration, in conjunction with Agritex field staff, conduct demonstration trials in communal areas.

The regulatory agencies should make use of more information channels to announce the withdrawal or restricted use of specific pesticides. Agritex field staff are generally uninformed of the status of pesticide products. Greater use of mass media channels and involvement of Agritex technical specialists would facilitate both extension agent and farmer awareness.

Linkages between Agritex and pesticide companies for technical information are weak. Agritex extension agents make limited use of the technical know-how within the pesticide companies. Pesticide companies should play a greater role in training extension agent in pesticide use, since Agritex has limited capacity to increase expenditure on staff training from budgetary sources. Given that it may be uneconomic for pesticide companies to conduct such training in communal areas, an alternative could be formal participation of private sector specialists in Agritex training sessions.

Pesticide companies should consider the standardization of some pesticide product names. A number of generic compounds are marketed using different trade names causing some confusion amongst extension agents, and most likely small-scale farmers.

Pesticide companies should provide greater support for pesticide information dissemination activities through increased use of mass media. Specific areas include more use of printed materials, radio and television targeted specifically for the small-scale farming sector.

TECHNOLOGY TRANSFER AND ADOPTION BY SMALL AFRICAN FARMER: THE ROLE OF RESEARCH AND EXTENSION EDUCATION

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Introduction

More than 70 percent of the 1/2 billion people that live in Africa live in rural areas. They work the land to feed themselves and produce food for commerce. In the early 1960s, about 30 percent of the Gross Domestic Product (GDP) of most African countries came from the agricultural sector. However, in the past two decades, Africa has become an importer of food. About 100 million Africans are without enough to eat and 8 million tons of food are imported each year (Interpaks, March 1989).

These conditions have lead to collaborative efforts of agricultural research and development on the part of international and national organizations. Agricultural research institutes, ministries of agriculture and agricultural development projects have been involved in research, and technology transfer to African farmers. Recent research efforts at the International Institute of Tropical Agriculture in Ibadan, Nigera resulted in improved cassava varities.

Purpose of this Paper

The purpose of this paper is to present results of a study of 100 farmers in Kwara State, Nigeria. The study examines the transfer of an unfinished technological package and the role of research-extension-farming linkages in the step-by-step decision making process used by farmers to adopt improved cassava varieties. The unfinished cassava technologies were developed by International Institute of Tropical Agriculture (IITA), Ibadan. The primary extension education program was administered by Agricultural Development Project (ADP) co-sponsored by the World Bank and the Federal Government of Nigeria.

The research questions of the study were:

1. How did farmers use the seven stage adoption process?

2. What adaptations did farmers make in utilization of the new technology?

3. How did farmers use the four research linkages?

Methods and Data Sources

The 7 step adoption decision model (awareness, interest, evaluation, trial, acceptance, utilization and adaptation stages), and 4 research-extension-farming linkages (interpersonal, institutional, locational and transfer method) were used as the conceptual framework for the research methodology and data collection. A combination of historical, descriptive and quantitative research methods were employed to gather the necessary information. Data were collected in three phases (secondary data, exploratory survey and an individual farmer field survey). The individual farmer field survey consisted of one hundred (100) contact farmers. Records review, questioning, questionnaires and interview guides were used to obtain secondary data and to complete the exploratory survey.

Phase 1. (1 month) Historical Perspective:

A time for developing a brief background for the specific topic under study. Limited to such topics as historical data, general statistics, and description of the current situation.

Phase 2. (5 months) Informal Area Survey:

Phase 2 involves an extensive collection of information from the region under study. Usually an area the size of a small country or a U.S. state is selected for study. The region is selected in a purposive manner. Reasons for selection can range from: this is the best example of technology utilization to this is the biggest problem in the region.

The field work consists of providing a detailed description of the persons, agencies, sites and methods of providing technology information and support to the establishment of the "Unfinished" technological packages. At the end of Phase 2, the extension researcher has a good idea of how technology distribution took place in the region identified.

Phase 3. (6 months) Scientific Target Study

The primary outcome of this phase will be detailed information regarding the seven stages of technology distribution. The seven stages are: Awareness, Interest, Evaluation, Trial, Acceptance, Utilization, and Adaptation. Specific data will report what linkages in four categories provided information about the "unfinished" technology. The four linkages needed for each stage are: 1. Who provided the technology transfer information, 2. Where the client was when the exchange occurred, 3. What agency provided the technology and 4. What method of technology exchange was used. These four linkages can be used at each of the seven stages of extension.

Results of the study:

1. Research Question #1: The seven stages of adoption:

   Farmers did employ the seven stage adoption decision model. Ninty four percent of the cassava growers were aware of improved cassava varieties. Eighty six percent of those aware of improved varieties used the unfinished technological package. Seventy percent of the farmers who used improved cassava made technological adaptations in the unfinished technological package.

   The farmers that dropped out along the adoption decision stages did so because: a) they were used to the old system of farming, b) there was no supply of improved cassava sticks, and c) improved cassava varieties grew too large.

2. Research Question #2: Farmer adaptations

   Farmers made changes in the unfinished technological package to suit their farming conditions. These changes included: a) a reduced amount of spacing between cassava stands, b) changing the rate application of fertilizers, c) using improved weeding methods, d) altered intercropping and monocropping, e) changes in recommended use of pesticides, and f) use of a shorter length of cassava planting material.

3. Research Question #3: Farmers use of the four types of linkages studied:

   Interpersonal linkage:
   The most used interpersonal linkage for adoption of improved cassava was the extension agent. The extension agent had an impact at every stage of farmers' decision making except for the awareness stage. The use of peers was most important at the initial stages (awareness, interest and evaluation) while self-experience was important at the stages of trial, acceptance and utilization.

   Institutional linkage:
   The area Agricultural Development Project (ADP) was used by farmers at every stage of the adoption decision-making while the Village was an important institutional linkage at the initial stages of awareness and interest.

   Locational linkage:
   The farmers home was the most used site for becoming aware and getting interested in using improved cassava. The farm site was the most used site to decide, evaluate, try, accept, utilize and adapt the unfinished technological package of improved cassava varieties.

   Method linkage:
   Home or farm visits were the most used methods for the awareness, interest, and evaluation of the unfinished technological package of improved cassava. Agricultural group meetings and on farm trials were most used for the stages of trial acceptance utilization and adaptation.

TABLE 1. Linkages utilized at the Seven Stages of Adoption-Decision Process

Linkages	Aware n=94	Interest n=87	Evaluate n=79	Trial n=71	Accept n=81	Utilize n=81	Adapt n=56
Interpersonal							
Peer	42	33	19	8	10	8	9
Extension agents	44	47	39	34	41	42	38
Researchers	2	2	3	1	2	-	1
Civil administrator	2	-	-	-	-	1	1
Cooperative leader	4	3	3	3	1	-	-
School teacher	-	-	1	1	1	1	-
Self experience	-	2	14	24	26	29	7
Institutional							
Ministry of agric.	4	1	2	2	1	1	1
Agric.Depmet.Project	46	49	41	34	42	42	39
National seed service	2	2	3	-	1	-	-
University	2	1	2	1	1	2	1
Cooperative society	7	7	7	5	7	3	2
Village/other village	32	24	11	7	6	4	6
Location							
Farmer's farm	22	25	50	70	55	61	48
Farmer's home	52	41	19	-	16	14	4
ADP zonal hqt.	3	3	1	1	1	2	1
ADP farm	3	5	4	-	6	2	1
NSS farm	-	-	1	-	-	-	-
Village hall	12	11	3	-	3	2	2
Another village	2	2	1	-	-	-	-
Extension methods							
Home visit	29	20	3	-	3	6	1
Farm visit	21	15	19	15	14	13	13
Survey interview	1	1	1	-	-	-	-
Discussion	10	8	5	-	2	-	-
Radio	3	1	-	-	1	-	-
Videoshow	1	3	1	-	1	-	-
Demonstration	4	13	13	4	-	2	3
Excursion	1	-	2	-	-	-	-
Field/farmers day	2	4	1	-	8	7	3
Group meeting	15	10	7	2	12	21	12
On-farm trial	4	7	17	43	29	23	17
On-station trial	3	2	2	-	-	-	-
Agricultural show	-	1	2	-	-	-	-
Self experience	-	2	6	7	10	9	7

Educational Importance

The results of the study are important for the following reasons:

Provided feedback from farmers on adaptations to direct future unfinished technological packages.

Provides directions in selecting persons, agencies, sites and methods to use when unfinished technological packages are provided to farmers.

Serves as reliable data to evaluate the outcome of unfinished technological packages.

After working for 13 months in Kwara State we have an idea of what happened as regards the use of an unfinished technological package. It was widely used and adaptations were made in many cases. We also discovered what the next step of development was as perceived by farmers. They wanted access to processing and marketing technologies. We know how change occurred in Kwara in 1991 and 1992. What we do not know is what has happened since we left the area.

In Illinois, I have eight years of data from 240 sites with 65 units of measure at each site continue to collect this data. Continuous data from reliable samples provides very good information for identifying research programs priorities.

The literature of African agricultural development is littered with well done case studies of follow up studies which are not continued. The study we completed needed to be institutionalized by the IITA and continued. The effort to continue to collect data is far less than the effort needed to complete the first study. Research institutions need to consider the advantages of institutionalizing this type of data collection.

Development of agribusiness anywhere in the World is based upon agriculture research and the distribution of the results of applied research. Each of us is dependent upon the continued development of science and technology applications in agriculture.

In agriculture, the term Extension is used to relate the process of distributing the results of "unfinished" technological packages. Although the CIGAR research centers do provide important training services, they are for the most part not extension agencies. This recommendation is to provide the capacity for research centers to evaluate the use of "unfinished" technological packages. The idea has two benefits for the centers. The two benefits are 1) to enable research agencies to report effectiveness and, 2) to identify new adaptations to direct research programs.

First, the research model of this study provided direct feedback to researchers. The feedback reported how farmers used utilized the unfinished technology and what adaptations or modifications were made to make the idea work at local sites. This information provided verification of use and ideas regarding the next step in research. This was evidence of an effective "unfinished" technological package.

Second, as researchers understand the extension process they will modify research ideas to better fit the needs of farmers. The process of education which brought about a change in behavior was documented with a scientific approach. Understanding the extension process will result in the development of more appropriate "unfinished" technologies.

The rate of new technology development is increasing. If we are to increase the efficiency of research, we must know it is being used and how it is being used. This three step process used in this study provided the research center with reliable utilization data.

THE IMPORTANCE OF EXTENSION EDUCATION IN THE POST HARVEST ACTIVITIES OF SOYBEAN IN NIGERIA[1]

By

Dr. S.M. Osho[2]

ABSTRACT

Protein deficiency is still a major problem in Nigeria and in Africa particularly among the low income group. Soybean has enough potential for alleviating malnutrition in root crop/cereal based Nigerian/African diets.

The IDRC soybean utilization project jointly implemented by IITA and National Institutes in Nigeria has been successful through extension activities in developing several food uses from soybean and disseminating these technologies to rural and urban people. Fifteen villages were selected as project sites and over 62,000 people have been trained on soybean utilization technologies. Extension education was found to have increased the production and utilization of soybean at project sites

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1.0. INTRODUCTION

One of the most critical factors militating against agricultural and socio-economic development in Nigeria is the general lack of an effective linkage between research institutions and the end users of research findings.

Extension involves the conscious use of communication of information to help people form sound opinions and make good qualitative decision (AERLS 1988). Extension education, in a nutshell, deals with strategic questions associated with the extension process. It collects and integrates existing knowledge about subject matter from other scientific disciplines and adds to knowledge through extension research. It builds on several conclusion-oriented sciences to help extension agents with their decisions (Van Den Bam and Hawkins 1988). An extension agent wishing to give sound advice to information beneficiaries must understand not only the extension process but also must have adequate technical knowledge of the discipline in which he gives advice. The art of extension really lies in combining two very basic skills viz: being a technologist and a communicator or teacher (Dumade 1989).

Though cultivation of soybean crop started in Nigeria as far back as 1908 but, not many knew its nutritional potentials and then, the post-harvest activities was only limited to threshing, drying and exporting. Today, post-harvest operations have been extended to processing, storage and consumption of soybean locally (Osho 1987).

Soybean has many favourable and nutritional attributes. It is very rich in protein (about 40%) and its oil (20%) is highly nutritious (Osho and Dashiell 1992). A UNICEF-Nigeria survey reported that in 1983, 15% of Nigerian children had low birth weight, while this figure increased to 25% in 1987. The search for alternative sources of inexpensive protein has led to the promotion of soybean for household consumption and small scale processing.

Extension education has been an effective policy instrument for stimulating soybean production, processing and utilization in situations where people are unable to reach their qualitative nutrition goal because they lack knowledge on use of the crops. By extending the knowledge that is available on developed soybean processing technologies to those people that need it most i.e. low income and group the quality of their life will have been improved because they will benefit from the uses of soybean. The causes of protein/energy malnutrition which soybean can rectify in developing countries like Nigeria have been identified and grouped into four categories, namely

(1) Ignorance of proper feeding requirements of a child and household and knowledge of general food nutrients and their roles in the body.

(2) Culture and traditional beliefs, for example, children who eat eggs will steal later in life. Or that the man who is the head of the family should eat the larger portion of meat cooked in the home, etc.

(3) Poverty

(4) Wrong methods of food preparation and processing coupled with unhygienic handling of foods.

1.1. THE SOYBEAN UTILIZATION PROJECT

Some of the reasons given by people for not using soybean were complete lack of knowledge of the nutritional benefit of the grain, long cooking time, development of an off-flavour during processing, presence of some antinutritional factors, lack of simple processing techniques and soybean recipes. It therefore became clear that new technologies would need to address:

- reduction of the long cooking time required to tenderize the beans.
- inactivation of the lipoxygenase enzyme present in soybean that causes the off-flavour and odour.

- ways to destroy the antinutritional factors like trypsin inhibitor, phytic acid, tannin, flatulence factors.

- means to ensure a high protein content of the processed soyfood

The main objective of the project was to develop household level and small scale processing technologies for soybean and to disseminate results of the technologies via extension education.

In order to accomplish the specific objectives of the project, IITA collaborated with National Programs and Institutions in Nigeria in Phase I (1987-1990) and Phase II (1990-1994). The institutes were Institute of Agricultural Research and Training (IAR&T), Ibadan; National Cereals Research Institute (NCRI), Badeggi; National Agricultural Extension Research and Liaison Services (NAERLS), Zaria and the University of Nigeria (UNN), Nsukka. These institutions, located in Oyo, Niger, Kaduna and Enugu States of Nigeria respectively, made their choice of project sites based on the production level of soybeans in each State. Linking with these national institutions enabled the project to have greater national coverage and, at the same time, some of the diversity in a country as vast as Nigeria was addressed. Thus, the scope of the project was broadened and it became highly interdisciplinary in context and execution.

The interventionist role of extension education was directed at achieving some or all of these objectives with particular reference to improvement of nutrition in general and prevention of protein deficiency, using soybean.

1.2. METHODS ADOPTED TO FULFIL OBJECTIVES:

1.2.1. Baseline survey

A baseline survey and monitoring surveys were conducted from 1987 to 1993 to document the status of soybean production, processing and utilization in Nigeria. The survey was conducted in 15 villages; using the Rapid Rural Appraisal (RRA) methodology, a farmer participatory approach. A four-man multidisciplinary team that comprise of a food technologist, a home economist, an agronomist and an agricultural economist interacts with farmers and their families to obtain information on soybean production and utilization.

1.2.2. Development of household and small-scale processing technologies.

Product development research was carried out to incorporate and fortify soybean into the traditional root and tuber crops (e.g. cassava), traditional cereals (e.g. maize, sorghum, millet, rice) and indigenous Nigerian foods specific to Northern, Eastern, Western and Middle Belt States in Nigeria. Extension activities which included training were conducted in local languages to educate people on uses of soybean.

1.2. RESULTS AND DISCUSSIONS

1.2.1. Baseline Survey (1987, 1990)

The major findings of the survey of the three communities (Ikoyi, Ijaiye and Igangan) showed that soybean production was relatively unimportant in the farm plans of farmers. About 40, 17 and 0 percent of the farmers cultivated soybean in Ikoyi, Ijaiye and Igangan respectively. With respect to soybean utilization, the Ikoyi community was the most conversant. Consumption of soybean in Ijaiye was not common (15%) while no one in Igangan consumed any soybean products.

There was steady increase in the percentage of farmers planting soybean between 1991 and 1992 in all the 15 villages surveyed which were located from South western, Eastern, Middle Belt and Northern States of Nigeria. There was also an increase in the acceptability of soybean based foods and the percentage of families consuming soybean increased from about 35 to 80% (Table 1). An average of about 1.5kg of soybeans is consumed per week in most families at the rural level.

1.2.2. Development of household and small-scale processing technologies

Baseline investigations of the chemical composition of some selected Nigerian traditional dishes (with and without soy-fortification) are shown in Table 2. The level of antinutritional factors, arising from the use of soybean which were monitored during processing are shown in Table 3. Processing effectively eliminated trypsin inhibitor activity and reduced the levels of phytic acid and tannin. Soy-based products generally had higher protein and mineral levels than the non-soy containing foods. There was no significant difference in the level of acceptance of soybean-based products and the conventional products by panel members. This study demonstrated the nutritional superiority of soy-based foods over the conventional foods and showed that the traditional processing methods effectively eliminated the antinutritional factors of soybean (Table 4).

New food products like soybean gari (soybean and cassava), soyvita (soybean and maize) were introduced in some villages. The results were positive for acceptability. Soybean milk was another product that played a very important role in the diets of Nigerians. Plain soybean milk, flavoured soybean milk (chocolate and vanilla) have gained acceptance among Nigerians. Soybean milk residue (okara) which has always been regarded as waste, is now used increasingly in the homes. With the increase in the home-level production of soymilk, there was a corresponding increase in availability of soymilk residue. A nutritional evaluation of soymilk residue shows that the protein is very high. Presently soymilk residue is being used to prepare the very popular vegetable soup, egusi where it replaces melon flour, a product which is becoming very expensive and generally unavailable.

The study on acceptability of soybean oil showed that soybean oil was highly acceptable to the middle and low income groups, while with further refining, the high income class will buy soybean oil. In the villages, Ikoyi, Igangan, Iroko, Adana and Oniyo, both crude and partially refined soybean oil were acceptable but partially refined oil was preferred to the crude oil.

Dry extrusion and screw press technology for producing fully cooked soy products, usable for both human and livestock feed was developed and tested. The products of the extruder were shown to be nutritionally superior to other soybean foods, because of the high protein content. The products which were later formulated to local recipes were tested for acceptability in some project sites. Soybean corn blend was accepted as a gruel (children's food), soy fullfat flour as akara (a popular cowpea product) and defatted soyflour as egusi for vegetable soup (Fig. 1).

1.2.2. Dissemination and extension activities

To strengthen the use of soybean at household and small-scale levels, extension programmes were used to educate people on soybean processing and utilization. Programmes were conducted in local language or in English depending on the audience. To facilitate training, recipe books were in all the Nigerian local languages were developed. Over 67,000 people have been trained on uses of soybean. Some of the extension methodologies used included:

(a) **Mass media:** Most of the post-harvest processing messages were most reported on radio and television. This programs included soybean talks or demonstration on some of the soybean processing methods. Local newspapers and magazines were also used a dissemination tools. There are two types of demonstrations which may be successfully used in the soybean programme, these include method demonstration and result demonstration. The type of demonstration method to be used was usually determined by the audience of target group. Project sites, markets, towns were chosen for demonstration based on invitation. Soybean food preparation were demonstrated.

(b) **Demonstration:** A method demonstration programme involves the following actions:

- (i) Organise the villagers at an agreed meeting place, make available necessary food items and equipment.
- (ii) Give a presentation - tell the villagers what you are doing, why you are conducting a demonstration and show them how to cook soybean.

(iii) Get acquainted with the women.

(iv) Make friends, don't rush through the process and give them time to be acquainted with you.

(v) Talk about soybean.

(vi) Allow the participants to tell you their ideas on soybean.

(vii) Get them to agree and try the soybean recipe themselves.

(viii) Help them to find where soybeans can be purchased.

(ix) Help them decide what to cook and assist them in the cooking process of a soybean dish.

Result demonstration was accomplished by showing villagers how health of a malnourished child improved through the use of soybean in the diet, or how a family adopted the use of soybean in their diet or how a food seller is making enough profit by selling soy akara.

Results from this project conclusively showed that people will adopt new technologies and recipes of soybean once they are carefully prepared, recognizing the people's cultural habits. Other important factors are that new technologies and recipes do not increase equipment cost, processing cost, or cooking time. In addition, the new technologies and recipes enhanced nutrition.

1.3. CONCLUSION

Production of soybean in the project sites steadily increased during the project period. There was also a remarkable increase in the level of soybean utilization in the villages use for the pilot project between 1987 and 1990. This positive change came as the villagers realised that soybean is highly nutritious and cheaper than other commonly eaten foods and that the preparation of most soy-based foods does not require additional time.

The percentage of farmers cultivating utilizing soybeans increased between 1991 to 1992. Within only one year, the data showed an increase in both production and utilization of soybean as food in the project sites.

In January 1987, 1990 and 1993 there were 4,419 and 824 retail sale outlets for soybean in Ibadan. This rapid increase indicates that soybean has become a popular food in Ibadan. In January 1987, 1990 and 1993, there were 2,19 and 33 companies procesing soybean in Nigeria (Table 5, 6). The project has showed that rural people in Nigeria will adopt new technologies like that of soybean that are based on a combination of indepth research and active extension and training. Nutritional studies have shown that soybean can rehabilitate severely malnourished children (kwashiokor and Marasmus) and generally improve the nutrition of low income families.

The challenge to the soybean utilization program at IITA is to develop strong research programs with national programs in other countries like Ghana, Cote d'Ivoire and Republic of Benin. The achievements and experiences gained in the Nigerian-based project definitely provide a spring board for wider operations in West Africa and even other regions of the African continent.

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Table 1: The percentage of farmers/households producing and utilizing soybean in IDRC project sites.

Location	Percent of farmers planting soybean			Percent soybean utilization		
	1987	1991	1992	1987	1991	1992
IAR&T: Oyo State						
Ikoyi (PS)	40	52	59	40	35	80
Ijaye (PS)	17	10	20	15	35	65
Igangan (NPS)	-	30	36	-	75	70
Imota - Lagos State (UC)	-	-	12	-	15	25
Idimu - Lagos State (UC)	-	5	8	-	11	21
NCRI: Niger State						
Diko (PS)	-	68	80	-	71	83
Mungorota (NPS)	-	4	29	-	1	15
Bida (UC)	-	28	28	-	11	22
NAERLS: Kaduna State						
Kurmin Masera (PS)	-	71	81	-	72	83
Makera village (NPS)	-	50	43	-	26	37
Kaya (UC)	-	48	61	-	19	50
UNN: Enugu State						
Okuku (PS)	-	11	21	-	11	44
Ozalla (NPS)	-	-	10	-	1	13
Enugu (UC)	-	-	2	-	11	22

Notes: PS - production site. NPS - non-production site; UC - urban center.

Table 2: The proximate and mineral contents of selected home-made soy-based products compared with products from traditional preparation method**

	Ogi*		Milk		Moinmoin		Akara	
	Conv****	Soy	Conv	Soy	Conv	Soy	Conv	Soy
Dry matter	99.1	99.1	97.5	97.5	95.	95.4	95.4	95.4
Protein (%)	7.2	21.1	21.8	14.20	17.28	24.7	16.1	23.0
Oil (%)	1.4	2.2	1.4	3.30	10.10	22.7	21.7	25.5
Phosphorus (%)	0.21	0.23	0.66	0.41	0.21	0.3	0.2	0.30
Calcium (%)	0.02	0.02	0.32	0.04	0.06	0.08	0.05	0.08
Magnesium (%)	0.04	0.04	0.01	0.01	0.02	0.001	0.01	0.01
Potassium (%)	0.31	0.30	1.40	1.83	1.20	0.90	1.0	0.91
Copper (%	1.00	0.90	4.00	7.76	4.40	6.0	4.0	4.1
Manganese (ppm)	16.00	15.8	4.00	14.07	53.50	72.0	42.0	54.5
Iron (ppm)	138.00	136.6	20.00	75.00	255.73	271.0	314.0	222.2
Zinc (ppm)	16.00	15.8	43.0	7.76	50.20	43.0	43.0	44.4

Note: *Ogi is maize porridge, moinmoin is steamed cowpea paste, and akara is fried cowpea paste
**Means of 3 readings
***Samples were either freeze dried (ogi and milk) or oven dried (moinmoin and akara) before analyses
**** conv = (conventional) product/recipe is product/recipe prepared using 100% normal ingredients without the addition of soybean

Table 3. Phytic acid, tannin and trypsin inhibitor levels of raw and processed soybean*

	Raw soy	Soyogi	Soymilk	Soy moinmoin	Soy akara
Phytic acid (%)	2.1	1.3	1.2	1.2	1.1
Tannin (%)	1.9	0.9	1.3	0.6	0.7
Trypsin inhibitor (mg/g)	16	NAD**	NAD	NAD	NAD
Percent soy	100%	50%	100%	50%	50%

Notes *Means of 3 readings
**NAD = no activity detected

Table 4: Specification of time, temperature and treatment for the complete inactivation of the soybean trypsin inhibitor at the household level

Method of heating	Temperature (°C)	Time (minutes)
Boiling under pressure		
Pressure cooking (whole soybean)**	100/15 psi	15
Soaking and pressure cooking (whole soybean)**	100/15 psi***	10
Boiling with additive		
Boiling with soda (whole soybean)**	100	20
Boiling with kaun[1] (whole soybean)*	100	20
Boiling whole		
Boiling (whole soybean)**	100	30
Soaking and boiling (whole soybean)**	100	20
Boiling with prior modification/processing		
Soybean grits (boiling)**	100	15
Dehulled soybean (boiling)**	100	10
Soybean flour (boiling)**	100	5
Roasting		
Roasting in sand (whole soybean)*	150	4
Roasting in pan (whole soybean)**	85-90	10-12

Note: [1] Kaun is local tenderizer
*Traditional method of processing
**Improved method of processing
***Pounds per square inche

Table 5: Summary of number of markets and retail sale outlets for soybean in Ibadan, Nigeria

Date	Markets selling soybean	Retailers selling soybean	Price (₦) 1kg	Form of selling
January 1987	2	4	1.50	Seeds
January 1988	6	8	1.50	Seeds
January 1989	13	237	3.50	Seeds and flour
January 1990	19	419	4.25	Seeds and flour
January 1991	25	539	5.79	Seeds and flour
January 1992	31	621	12.86	Seeds and flour
January 1993	42	824	15.50	Seeds and flour

Table 6 Some soybean products that are being processed and marketed by companies in Nigeria (February 1992)

Company	Location (State)	Product	% Soybean used in the product
1. Betamarks	Lagos	Soybean flours	100
2. DLOB	Oyo	Soy Oil/High Protein Cake	100
3. Farina	Lagos	Soybeverages	100
4. Kofa Agric. Ventures	Kwara	Soy Oil/High Protein Cake	100
5. Milkman	Oyo	Soymilk	100
6. Oja Farms	Oyo	Soy Oil/High Protein Cake	100
		Casasoy	30
7. Taraku Oil Mills	Benue	Soy Oil/High Protein Flake	100
8. Uncle Segun Food processing and preservative company	Oyo	Soy Powder	100
9. Jomartex	Oyo	Soymilk	100
10. Lisabi Foods	Lagos	Soy Custard	30
11. Smallette		Soyogi	30
12. Funtua Oil Mills	Kaduna	Soy Oil/High Protein Cake	100
13. Glaxo Nigeria	Lagos	"Babeena" baby food	30
14. Nestle Foods	Lagos	"Nutrend" baby food	30
		"Golden Morn" Breakfast food	30
15. Imo Health Foods	Imo	Soybeverages	100
16. Cadbury Nigeria	Lagos	"Das" candies	10
17. Tuns Oil	Osun	Soy Oil/High Protein Cake	100
		Extruded Products	
18. Marrison Ltd	Lagos	Extruded Products	100
19. Akiibiti Farms	Ondo	Extruded Products	100
20. Deagbo Industries	Oyo	Soyvita (beverages)	100
21. Tella Food Industries	Oyo	Soymilk	100
22. Goodings Health Foods	Lagos	Texturized vegetable protein (Nutrela)	100
23. Niger Dock	Lagos	Soymilk	100
24. Jol Ideal Family Farm	Ondo	Vegetable oil	100
25. Temitope Biscuit Indus. Ltd	Ogun	Soybiscuits, Baby food	10, 30
26. Orman Industries Comp. Ltd	Oyo	Extruded soy full fat and defatted soycake	100
27. Al-Bahamas	Lagos	Baba Ogi	30
28. Odichie Bakery	Lagos	Soybread	10
29. Morgan	Oyo	Soyflour	100
30. Pfizer Nigeria Ltd	Lagos	Livestock feed	30
31. Buckingham Ltd	Lagos	Mam Joy baby food	30
32. Alphatec	Oyo	Soyoil/Livestock feed	100
33. Cocoa Industries	Lagos	Chocolate bar	10

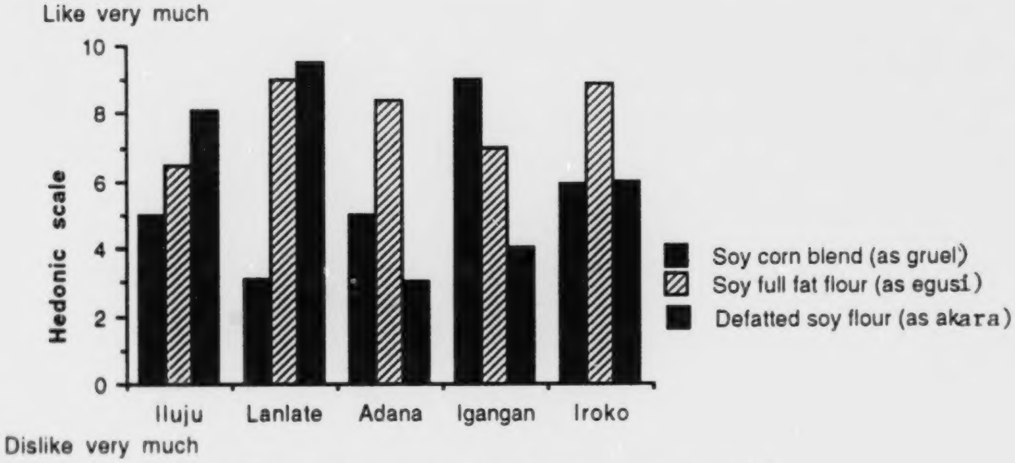

Fig. 4.2 **Acceptability of extruded products at rural level: soy corn blends; soy full fat flour; soy defatted flour**

Session G RECONCEPTUALIZING EXTENSION

1. **Perceptions Regarding Agricultural Extension Education in Swaziland**
   Musa M. A. Dube
   Robert A. Martin

2. **Philosophy, Mission and Focus of Agricultural Extension in Africa, Asia, and Latin America: Perceptions by Extension Educators and International Graduate Students of Extension Education in the United States**
   Ismail E. Mohamed
   Julia A. Gamon
   Larry D. Trede

3. **Technology Transfer or Issue Management: A Case Study with Iranian Nomads**
   Mohammad H. Emadi
   Robert A. Woog

PERCEPTIONS REGARDING AGRICULTURAL EXTENSION EDUCATION IN SWAZILAND

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Introduction

Agricultural Extension Education (AEE) is widely recognized as a means to improve rural life. Its primary purpose is to educate rural people through nonformal educational means based on their needs and problems, and help them solve their agricultural problems on a self-help basis (Dusenberry, 1966; Rivera & Corning, 1990). Blackburn and Vist (1984) quoted Leagans to have stated that:

> The process of extension education is one of working with people, not for them; of helping people become self-reliant, not dependent of others; of making people the central actors in the drama, not stage hands or spectators; in short, helping people by means of education to put useful knowledge to work for them. (p. 1)

However, the aforementioned characterization of AEE is often interpreted in many ways by different people. For this reason, Rivera and Corning (1990) stated that it is wise to look at AEE from a much broader context of agricultural development goals. Also, one should view AEE from the overall direction of the country's development.

Agricultural Extension systems worldwide have become the focus of debate among policy-makers, practitioners, educators, and clientele groups of Agricultural Extension Education (Pickering, 1984-85; Belloncle, 1984-85; Rivera, 1990). The general feeling is that Agricultural Extension systems have not yielded the anticipated results. According to Belloncle (1984-85), the Agricultural Extension systems' inefficiency has been compounded by misguidance in government policies, program philosophies, and program missions. Rivera (1990) further stated that public extension has been criticized for not (1) being relevant, (2) having sufficient impact, (3) being adequately effective, (4) being efficient, and sometimes for not (5) pursuing programs that foster equity.

In the case of Swaziland, internal and external reviewers have constantly alleged that the Agricultural Extension system is shrouded in ambiguity (Easter, 1985; Trail, 1985 and Diamond, 1992). The major criticisms are that program principles and objectives, and teaching methods are not well-defined. Furthermore, Agricultural Extension in Swaziland is believed to be largely negatively impacted by various organizational problems. Additionally, efforts expended by the Government of Swaziland to improve Agricultural Extension have not been adequate.

To find ways to improve the quality of the Agricultural Extension system in Swaziland, additional research was necessary. In this connection, a study of perceptions held by selected extension staff and farmers regarding Agricultural Extension Education in Swaziland was deemed appropriate to gather basic information and use it to restructure programs of Agricultural Extension.

The "reframing" concept suggested by Bolman and Deal (1991) provided the theoretical framework for this study. This concept provides a systematic approach to studying an organization. It encourages the use of schemata, maps, images and metaphors. To revitalize Agricultural Extension, one needs to adopt and use a "reframing" concept so that strengths and weaknesses of the system can be identified and isolated. It could further help in the effort to restructure extension systems so that they are able to make the anticipated impact on agricultural development.

Bolman and Deal (1991) stated that three approaches are fundamental to enabling an organization to be effective and efficient. First, they proposed that improvement of management and leadership in the organization is fundamental. Second, they pointed out that consultants could be contracted to help revitalize an organization. Third, government intervention through legislation, regulation, and policy-making could be another option. They advised that the latter strategy has to be employed with caution. Additionally, they advanced that the process of helping an organization to be more effective and efficient is described as "reframing the organization".

"Reframing the organization" is the process of drawing schemata, maps, images, and metaphors of an organization that will make it more effective and efficient in achieving organizational goals. Frames are both windows on the world and lenses that bring the world into focus. They filter out some things while allowing others to pass through easily.

Four frames are key to the reframing process. These frames include structural, human resource, political, and symbolic frames (Bolman & Deal, 1991). The frames could serve several purposes. They each provide a pluralistic view of an organization and a theoretical perspective that has a unique and comparative advantage. Frames could enact a different image of an organization and contain ingredients that are essential to an integrative science of an organization.

The structural frame pertains to the notion of defining structure (of an organization) such that goals and all the pertinent information is laid out clearly. This approach helps to make goals and information of an organization much clearer. The human resource frame pertains to the employee morale and motivational levels. Political and symbolic frames refer to power distribution, which cannot be ignored, and the enormous extent to which reality is socially constructed and symbolically mediated, respectively.

The suggested reframing approach by Bolman and Deal (1991) could provide an unbiased analysis of the AEE system. Such an approach was considered suitable for the analysis of the AEE system in Swaziland. By using the frames in combination, our ability to understand and manage any organization could be enriched. A more comprehensive and multi-frame approach is rapidly gaining steam and promises a challenging and exciting future for the understanding of organizational science (Bolman & Deal, 1991). Perceptions of AEE held by field officers, extension officers and farmers could be used as a "window" or "frame" of reference to be used in the analysis of the AEE in Swaziland.

The success of any educational program depends largely, among many other things, on clear objectives, principles, teaching methods, and teaching tools (Trail, 1985). These aspects should be guided by an explicit and comprehensive agricultural policy which is based on the primary actors and clientele opinions about the program (Programme Advisory Note, 1991; Dutia, 1989). Also, a sound philosophy is necessary to establish an effective educational program (Trail, 1985; Programme Advisory Note, 1991).

A need to develop a deeper understanding of the problems of the AEE in Swaziland that are perceived by the primary actors, namely field officers, extension officers, and farmers, was considered to be very essential. It is generally believed that there are many problems which detract from the conduct of AEE in most developing countries. Swaziland is no exception. Therefore, an analysis of the AEE program in Swaziland as perceived by the selected groups in this study was considered to be a sound course of action. Results of the study could be very useful to the Ministry of Agriculture and Cooperatives (MOAC) and all stakeholder groups on how to make the AEE program in Swaziland more effective.

Purpose and Objectives

The purpose of the study was to analyze the perceptions regarding the Agricultural Extension Education program in Swaziland as perceived by field officers, extension officers and farmers.

Specifically, the study attempted to (1) identify the perceptions of selected stakeholders regarding Agricultural Extension in Swaziland, to (2) identify demographic characteristics of field officers, extension officers and farmers, to (3) compare perceptions of respondents according to educational level, position, and gender of respondents and to (4) develop a model for program planning and management.

Methods and Procedures

The study used a descriptive design. The target population for this study was all field and extension officers and farmers who were providing and/or receiving Agricultural Extension services in the Rural Development Areas (RDA's) in Swaziland. The professional educators were estimated to be 200 field officers and 20 extension officers. A representative sample of 50 field officers was randomly selected. Three officers were selected from each RDA and four were selected from the two largest RDA's. All the extension officers (20) were included in the study.

To select a representative sample of farmers to participate in this study, each selected field officer was asked to provide a list of farmers in his area. From these lists, three farmers were randomly selected in the RDA's and four from the two largest RDA's. The total sample drawn was 50 farmers. The total sample for the study was 120 participants.

Following a review of selected studies and reports (Ibrahim, 1979; Ogola, 1982; Bombridge & Steyn, 1984; Twala et al., 1984; Trail, 1985; Easter, 1985; Gajian & Lawrence, 1986; Msitsini, 1987; Khumalo, 1988, 1989; Creswell, 1990), an instrument was developed.

The instrument was divided into four parts. Part I consisted of extension program objectives, program principles, teaching methods, and teaching tools. Parts II, III, and IV consisted of problems impacting AEE activities, demographic characteristics, and general suggestions and comments on how AEE in Swaziland could be improved, respectively.

In Part I, a Likert-type scale of Strongly Agree=5, Agree=4, Neutral=3, Disagree=2, Strongly Disagree=1 was used by the respondents to rate each item by circling the appropriate letters. Under Part II, the same Likert-type scale was used with slight changes to avoid respondents from rating items without carefully reading each statement. In this section, the respondents were asked to rate each statement by placing a check mark (√) under each number that was closest to their opinion.

A survey instrument was used to collect the information from the participants. The survey form was reviewed by a panel of experts (Extension specialists, international program officers) who were familiar with the extension system in Swaziland and approved by the Human Subjects Research Review Committee of the university. These procedures were followed to insure content validity. It was bound in a booklet form for it to be attractive, easy for the respondents to read and complete, and easy for the researcher to code and score (Dillman, 1978).

The instrument was pilot-tested with former extension agents who were undergraduates in the University of Swaziland and international graduate students in Agricultural Education. The instrument's reliability coefficient was calculated (0.97) and was considered reasonable to proceed with the data collection. Survey instruments were mailed and hand delivered to field and extension officers. Farmers were interviewed by the researcher.

The following statistical procedures were used to analyze the data: frequencies, percentages, means, standard deviations, t-test, one-way analysis of variance, and Scheffe' procedure.

Findings

The overall response rate was 106 participants (88.3 percent). These included 43 field officers, 15 extension officers and 48 farmers.

A review of the findings of this study resulted in the following major observations:

1. The average ages for the field officers, extension officers, and farmers were 33.3 years, 40.5 years, and 50.6 years, respectively.
2. The average farm/work experience for the field officers was 9.9 years, extension officers 17.2 years, and 20.8 years for farmers.
3. Most field officers, extension officers, and farmers were male and married.
4. All the field officers had a certificate in agriculture, and extension officers had a diploma in agriculture.
5. Some farmers had at least some form of formal education.
6. The majority of the farmers surveyed were farming for both family consumption and marketing purposes.
7. The majority of the farmers surveyed were growing maize as a major enterprise.
8. Few farmers were raising livestock as an enterprise.
9. Over one-half of the farmers surveyed indicated that decision making about farming in a household was made by husband and wife.
10. Field officers, extension officers, and farmers tended to give high ratings to the following program objectives: 1) helping farmers to raise quality crops, 2) teaching farmers to conserve the soil, and 3) encouraging farmers to plan their farming.
11. The respondents tended to give high ratings to the following program principles: 1) encouraging teamwork among extension staff, 2) using suitable teaching methods, 3) developing problem-solving skills, and 4) using farmers' needs as a basis for program planning.
12. Of the teaching methods studied, the following had the highest ratings: 1) method demonstration, 2) result demonstration, and 3) field days.
13. Field officers and extension officers reported high ratings for the following teaching tools: 1) field support guides, 2) agricultural research results, and 3) tours.
14. Field officers, extension officers, and farmers reported high ratings for the following problems in AEE: 1) wide area to cover, 2) shortage of transportation, and 3) farmers' reluctance to attend extension meetings.
15. There was no statistically significant difference among the means of perceptions of respondents from Manzini, Hhohho, Lubombo, and Shiselweni regarding their rating of teaching methods. Significant differences were found on how the respondents rated some program objectives, program principles, teaching tools, and problems.

16. The respondents with lower education tended to rate some program objectives, program principles, teaching methods, tools, and problems impacting AEE higher than did respondents with higher education.

17. Of the three groups of respondents, farmers consistently rated highly most of the program objectives, program principles, teaching methods, and problems impacting AEE.

18. Gender of respondents had little influence on how participants rated program objectives, program principles, teaching methods, teaching tools, and problems impacting AEE.

19. Marital status of respondents had some influence on how respondents rated program objectives, program principles, teaching methods, teaching tools, and problems impacting AEE.

20. There was little to moderate relationships shown between rating of program objectives, program principles, teaching methods, and problems impacting AEE and selected demographic characteristics of field officers, extension officers, and farmers.

Conclusions and Recommendations

Based on the findings of the study the following conclusions were made:

1. Demographic characteristics of field officers, extension officers, and farmers indicated several differences among the groups but very few practical differences in their perceptions of Agricultural Extension Education in Swaziland.

2. More males participated in this study than females, however, this is not an indication of lack of female farmers in Swaziland.

3. The education level of extension staff is very low in Swaziland.

4. Farmers in Swaziland were not highly educated although some had at least some form of education.

5. Extension staff and farmers' perceptions of Agricultural Extension Education regarding program principles, objectives, teaching methods and problems indicated much agreement.

The following recommendations were made based on the findings:

1. Findings of this study should be reported to Agricultural Ministry officials.

2. Educational programs should be implemented to help Extension professionals acquire the "process" skills identified in this study as being critical to the success of AEE.

3. A model or systematic plan for delivery of Extension programs should be developed to meet the specific needs outlined in this study.

Implications to Education

A model was developed based on the findings of this study. The model indicates that the government has a significant role to play in planning agricultural extension programs based on the strong agreement found among the participants in this study. This study confirms what other studies have found in that many Extension programs focus mainly on transferring technology without giving much consideration to "how" technology can best be transferred. The process needs as much attention as the technology itself. Agricultural Education has responsibility and an opportunity to enhance Extension systems around the world by providing training in the process skills to affect change in these systems.

The essence of this study was to determine the importance field officers, extension officers, and farmers attach to selected aspects of AEE in Swaziland. The ultimate goal of this study was to use the findings to help the Ministry of Agriculture and Cooperatives in its continuing endeavor to make the AEE system in Swaziland more effective and efficient.

The model for planning AEE activities (Figure 1) is proposed for consideration by the Ministry of Agriculture and Cooperatives. This model was prepared against the background of the theoretical framework of the study. Bolman and Deal (1991) stated that "reframing" is a means to improve an organization's efficiency and effectiveness. Further, through the reframing approach, all key components of an organization are clearly mapped. In this model, the key elements in planning and delivering of extension activities are laid out. It is believed that with such a model, the detracting factors and misguidance of the AEE system in Swaziland could be avoided. According to Belloncle (1984-85) and the Programme Advisory Note (1991), a lack of systematic program planning and delivery systems of extension activities has caused many AEE programs to be less effective and efficient.

The model further seems to be in line with the general approach to planning and delivering extension activities. While AEE should have a philosophy and mission, these two should be blended in with the "needs analysis" in which local farmer input, field extension staff, community, and organizational resources are taken into account. According to the Minnesota Program Development Model in Prawl et al. (1984), it is very important to recognize the needs of the target clientele. Boyle (1981) supported the same view when he stated that needs analysis should be the first step in program development.

In view of this proposed model, what is the relationship between it and the findings of this study? The findings in this study demonstrate the ability of officers, extension staff, and farmers to carefully judge the importance of selected aspects of AEE in Swaziland relative to making the AEE system more effective and efficient. The relationship between the findings and the model is that all five aspects of AEE which were rated are directly related and part of the AEE planning process. At each stage, one or a combination of the factors rated are very important. The need for the Ministry of Agriculture and Cooperatives in Swaziland to consider this model cannot be overemphasized.

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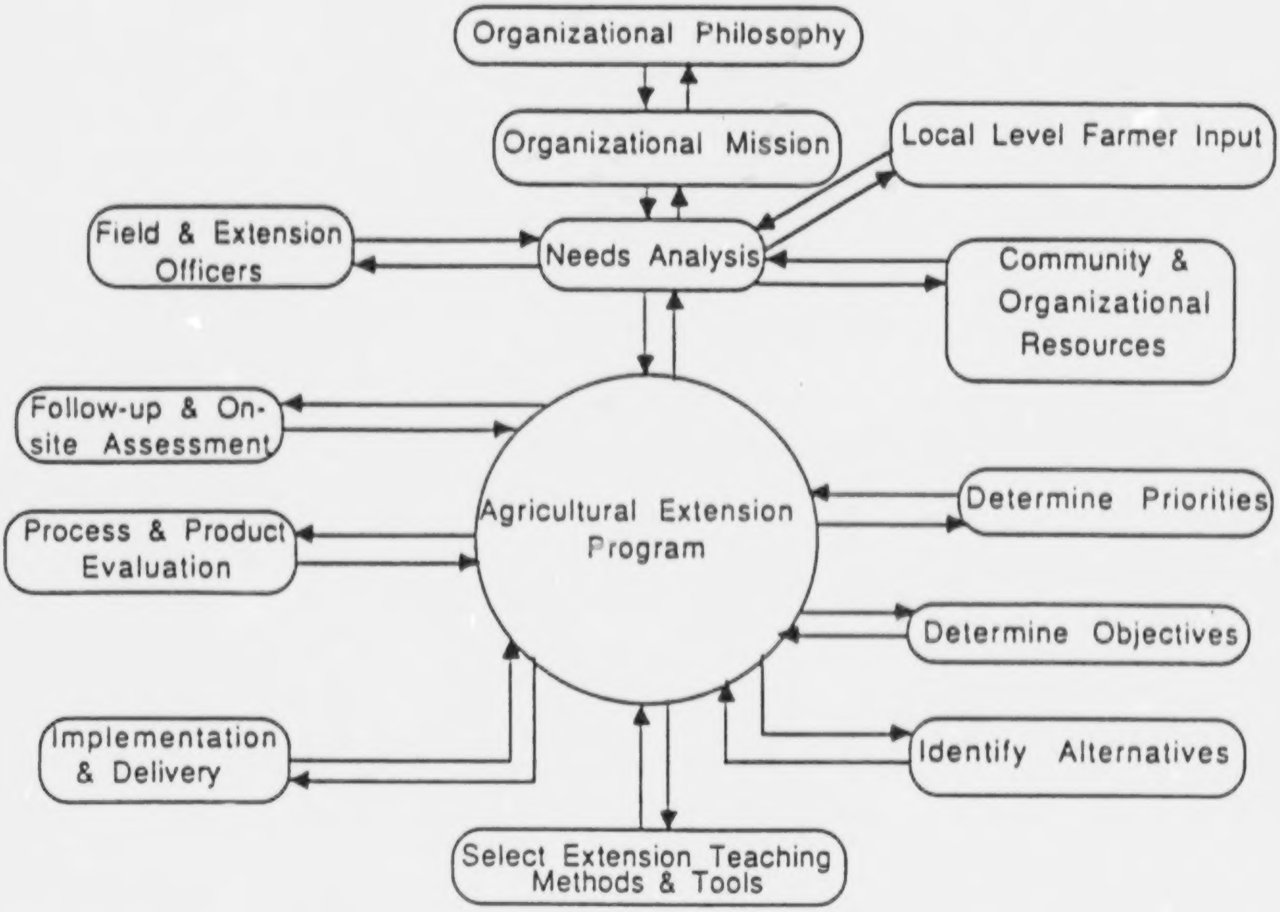
Organizational Philosophy
Organizational Mission
Local Level Farmer Input
Field & Extension Officers
Needs Analysis
Community & Organizational Resources
Follow-up & On-site Assessment
Agricultural Extension Program
Determine Priorities
Process & Product Evaluation
Determine Objectives
Implementation & Delivery
Identify Alternatives
Select Extension Teaching Methods & Tools

Figure 1 : Proposed Model of Planning Agricultural Extension Activities in Swaziland

Philosophy, Mission and Focus of Agricultural Extension in Africa, Asia, and Latin America: Perceptions by Extension Educators and International Graduate Students of Extension Education in the United States

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Introduction

One of the most critical elements of development in Third World nations involves improving the performance of the agricultural sector (World Bank, 1990). This in turn, requires the transmittal and utilization of knowledge by many people, including small, hard to reach farmers (Havelock, 1971). Education is one of the mechanisms by which an agricultural breakthrough in these nations might take place with the dominant approach to be non-formal education as used by extension organizations (Blankenburg, 1984). Extension education agencies that have largely educational functions have come to receive greater recognition in regard to the indispensable nature of their activities. However, for the last three decades or more, agricultural extension organizations in Africa, Asia, and Latin America have been pressured to carry out governmental policies rather than to meet the needs and wants of rural people (Moris, 1991). Continuing concern about this problem has been widely stated around the world (Claar et al., 1983; Seepersad, 1983).

A careful analytical review of the history of extension organizations in Africa, Asia, and Latin America reveals that most of these nations have inherited their systems of administration from colonial times (World Bank, 1990). Extension-type activities in most of these nations were usually associated with commodity-improvement schemes and evolved from the colonial advisory service, which resulted from the colonial sponsorship of research on export crops (Seepersad, 1983). This situation not only influenced the formal organizational code of structure of the organization, but also the content of their work (Blankenkburg, 1984). As a result the extension organizations were interfaced within the agricultural bureaucracy, characterized by a distinctively top-down authoritarian approach in transferring information and recommendations related to government cash crops and oriented to meet government's needs and wants (Seepersad, 1983, Moris; 1991).

Many Third World nations have tried to improve their extension organizations with the assistance of donor agencies by adopting new methods such as the Training and Visit (T&V) and Farming System Research/Extension (FSR and FSR/E). However, most of the new alternatives suggested have been focused on methodological issues such as the number of contact farmers, ratio of extension agent/ farmers, and number of farm visits rather than targeting the fundamentally defected extension organizational structure (Moris, 1991). Today, there is a growing recognition that changes must be brought about in the agricultural extension organization structure as well as operational procedures, policies, management, and work practices before programs will have any impact on the rural poor (Moris, 1991). Attention should be given to more fundamental issues such as the philosophical orientation, control, financial sponsorship, mission, focus and interface of the extension organizations (Claar et al. 1983; Moris, 1991).

Purpose

This study focused on extension education in Africa, Asia, and Latin America as perceived by extension educators and international graduate students of extension education in the United states. Specifically, the study described characteristics of the two groups and documented their perceptions toward some of the policies and characteristics of the extension organizations in Africa, Asia, and Latin America. In addition, the study focused on possible differences between the groups' perceptions and possible relationships between groups' characteristics and perceptions.

Methodology

The framework of this study consisted of 33 universities in the United States that offered graduate programs in extension education in the Fall of 1992. The 33 schools reported as of Fall 1992 that there were 96 extension educators and 128 international graduate students of extension education.

The survey instrument used to collect data was developed based on an intensive literature search and on a version that was used by Kouzekanani in 1983. The first part of the instrument measured the level of agreement and disagreement among respondents about selected policies and characteristics of the extension organizations in Africa, Asia, and Latin America. Twenty-seven statements were included in this part. Subjects were asked to respond to each statement using a Likert scale (1 to 5): 1) strongly disagree, 2) disagree, 3) undecided, 4) agree, and 5) strongly agree. The second part was different for each group and was designed to collect demographic data.

The instrument was tested for its validity and reliability at Iowa State University. A panel of five experts assessed the instrument for instructions, item content, and validity of the scale used. The instrument was pilot tested at Iowa State University. The analysis of the pilot test yielded a Cronbach's Alpha of .72. The first mailing of the instrument brought 73 completed questionnaire from extension educators (76%) and 68 from international graduate students (53.1%). The total responses from both group in the first mailing was 141 (62.9%). The follow-up resulted in additional 10 completed surveys from extension educators and 8 from international graduate students for a total response of 159 completed surveys (70.9%). An appropriate fellow-up procedure that compared non-respondents with respondents found no differences.

Reliability, frequencies, and measure of dispersion, factor analysis, and analysis of variance were employed to analyze the data.

Results and conclusions

Cronbach's Alpha Coefficient for the 27 items in the first part was .76.

Findings of the study indicated that the typical extension educator respondent was a 48 year-old man who was a full professor, had about 25 years of total work experience, 16 years of extension work experience, taught extension courses for about nine years, acquired some kind of international work experience, and taught in a school in the southern region of the United States. The study also showed that the typical international graduate student of extension education studying in the United States was a 35 year-old, African, doctoral male student, had about 5 years of extension work experience, received a bachelor's degree in a home country, got a master's in the United States, spent three years studying in the United States, and was studying in a school in the north central region of the United States.

The first five items in the survey were related to the philosophy and mission of the extension organizations. Data in Table 1 indicated that the extension educator respondents strongly agreed that the extension education organizations in Africa, Asia, and Latin America should have both a clearly stated educational philosophy and mission. The two ideas were also supported by the international graduate student respondent, but to a significantly lesser degree (alpha= .05). The data also indicated that while the international graduate student respondents remained undecided, extension educator respondents strongly rejected the idea that enforcing government production goals should be the essence of the extension organizations. However, both groups supported the idea that the extension organizations derive their mission from national policies. Results on the first five items were a clear indication that extension educators tended to more strongly support claims by Claar et al. (1983) than the international graduate students. The authors advocated that the extension organizations in the Third World should maintain an educational orientation. Furthermore, the idea of extension organizations deriving their mission from government goals seemed to be more acceptable by all respondents than the idea that the organizations adopt and enforce these goals as an ultimate mission. Although government production goals in most of the Third World countries emphasized increasing export crops (Seepersad, 1985), Van

Table 1. Means, standard deviations, and t-tests of each of the selected policies and characteristics of the extension organization as reported by extension educators and international graduate students.

Selected policies and characteristics of the extension organization	Extension educators (n=83) Mean S.D.	International students (n=76) Mean S.D.	t-value	α-tail probability
The Extension Organization, in Africa, Asia, and Latin America should:				
1. Have a clearly stated educational philosophy	4.62 0.56	4.21 1.08	-2.98††	.003**
2. Have a clearly stated educational mission	4.67 0.50	4.28 1.06	-2.91††	.004**
3. Derive its mission from the national policies	3.79 0.84	3.68 1.13	-0.70††	.483
4. Function according to its own philosophy	3.90 0.89	3.80 1.06	-0.63	.527
5. Enforce the government's production goals	2.37 1.09	3.28 1.13	5.12	.000**
6. Have priorities based on national policies	3.49 0.82	3.52 1.20	0.16††	.875
7. Have priorities based on research findings	4.24 0.73	4.09 1.03	-0.98††	.328

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††Separate variance estimate.

*Significant at α = 0.05.

**Significant at α = 0.01.

Scale: 1. Strongly disagree; 2. Disagree; 3. Undecided; 4. Agree; 5. Strongly agree.

Table 1. Continued

Selected policies and characteristics of the extension organization	Extension educators (n=83) Mean S.D.	International students (n=76) Mean S.D.	t-value	α-tail probability
8. Have priorities based on the number of farmers affected	3.90 0.90	4.07 0.99	1.09	.277
9. Have priorities based on availability of human resources	3.93 0.70	4.13 0.85	1.65	.101
10. Be within the Ministry of Agriculture	3.34 1.08	3.80 1.27	2.43	.016*
11. Be within the Ministry of Education	2.56 1.02	2.54 1.35	-0.07††	.943
12. Be within the University (e.g., College of Agriculture)	3.96 0.89	3.88 1.27	-0.48††	.636
13. Be involved in educational duties	4.49 0.67	4.13 1.05	-2.56††	.012*
14. Be involved in educational and noneducational duties (such as distribution of inputs/loans)	2.46 1.09	3.34 1.36	4.49††	.000**
15. Use a "top-down" (i.e., someone at the top of the administrative hierarchy propose the major ideas) type of program development	2.24 1.12	1.96 1.23	-1.46	.146

Table 1. Continued

	Selected policies and characteristics of the extension organization	Extension educators (n=83) Mean S.D.	International students (n=76) Mean S.D.	t-value	α-tail probability
16.	Use a "bottom-up" (i.e., someone at the lowest level level of the organization comes up with an idea and passes it through the organization as a means of program determination) type of program development	3.96 0.90	4.24 0.96	1.886	.064
17.	Operate under policies established by the sponsor (e.g., Ministry of Agriculture)	3.33 0.92	3.15 1.34	-0.99††	.322
18.	Operate under policies established by the clientele (e.g., small farmers)	3.67 1.10	3.80 1.21	0.73	.467
19.	Operate under polices established by international agencies (e.g., the World Bank)	2.71 1.00	2.29 1.19	-2.40	.017*
20.	Operate under policies established by both the sponsor and the clientele	3.91 1.06	4.07 1.09	0.90	.372
21.	Operate under policies established by both the sponsor and the international agencies	3.03 1.07	2.75 1.27	-1.48	.142
22.	Operate under policies established by a combination of the sponsor, the clientele, and the international agencies	4.00 1.06	4.01 1.05	0.08	.936

Table 1. Continued

	Selected policies and characteristics of the extension organization	Extension educators (n=83) Mean S.D.	International students (n=76) Mean S.D.	t-value	α-tail probability
23.	Be funded by the central government	3.50 0.90	3.58 1.09	0.50	.621
24.	Be funded by local sources (e.g., regions/ districts)	3.53 0.78	3.53 0.99	0.06††	.954
25.	Be funded by combination of central government and local sources	4.49 0.59	4.47 0.91	-0.22††	.826
26.	Focus on technology (recommendation from research)	3.81 0.84	3.69 1.25	-0.69††	.491
27.	Focus on increasing the capacity of the people (empowering people)	4.57 0.55	4.51 0.89	-0.51††	.609

den Ban (1982) noted that the idea that agricultural extension was a way to educate farmers and that it was an instrument of government policy were not in disagreement. The author suggested that some of the goals of government policy could be reached if the farmers made better decisions that were in their own interests.

Items 13 and 14 (Table 1) asked about the focus of the extension organizations on educational versus non-educational assignments. The idea that the extension organizations be involved in educational duties was supported by both groups. Extension educator respondents strongly rejected the idea that the organizations be involved in both educational and non-educational duties. However, results from international graduate student respondents indicated indecision. This findings were congruent with the results of the study on the first five items. The findings also indicated significant differences between the mean scores of the two groups on both items with the mean score of the extension educators significantly higher on item 13, (educational duties) and lower on item 14, (both educational and non-educational duties).

The focus of items 15 and 16 (Table 1) was on the type of program development. The idea that the extension organizations use a top-down approach to program development was the most strongly rejected idea by both extension educator and international graduate student respondents. Both groups agreed that a bottom-up type of program development should be used by the extension organizations.

Items 26 and 27 focused on what the extension organizations should emphasize: empowering rural people or transferring research recommendations. The idea that the extension organizations focus on empowering the rural people was the only single idea in this part that was strongly supported by both groups.

Eight factor indices were handled as a set of multiple dependent variables in the analysis of variance. The findings indicated that extension educators with longer years of total work experience were more supportive to the idea of a government-responsive extension organizations. However, extension educators with longer years of extension work experience were less supportive to the same idea. International graduate students' data indicated that students with longer studying periods in the United States tended to be less supportive to the idea of a government/client-responsive extension organization.

This study supported Claar et al. (1983) proposals to adopt and adapt the Cooperative Extension Service model to the Third World. Both Extension educators and international graduate students of extension education supported the concepts that the extension organizations in Africa, Asia, and Latin America be primarily educational in nature, have the freedom and orientation to empower and help clientele solve their problems and satisfy their need, have a high degree of local involvement in both financing and control, and be less oriented to satisfy governmental production goals.

Educational importance

It was a basic premise behind this study that replacing existing models of extension in the Third World with another without trying to consider reforming the defected organizational structure would result only in a limited success if not a complete failure. International development agencies if genuinely interested in helping these nations improve their extension organizations should consider seriously changing their reform strategies. The literature review, findings, and conclusions of this study supported proposals that called for revising the philosophy, mission, function, placement, orientation, and control of the extension organization.

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TECHNOLOGY TRANSFER OR ISSUE MANAGEMENT; A CASE STUDY WITH IRANIAN NOMADS

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Introduction

This research aimed at identifying problems associated with the pursuit of a grazing nomadic life style. It is also as part of broader strategies aimed at evaluating and re conceptualizing extension theory and practice , and as such the findings are generalised beyond the reported case study with Iranian nomads.

In post-revolutionary Iran, the government has placed considerable resources into the provision of advice and services to nomads. The Government goals are ;

(a) improving animal production, through technical services;
(b) natural resource conservation, by improved range management ;
(c) provision of social amenities associated with settled societies.

The paper will present the perception of problems from a traditional point of view, then it will contextualize the problem to illustrate different view points which are expressed as a problematical situation and finally will discuss the methodological challenge involved in researching situations where there is a complex ecological-social interaction . The limitation of a predominantly technology -based approache will be discussed . The propositional theme of the paper is that development and extension needs to shift from conventional empiricism which is imposing the idea of policy makers and experts through the "technology transfer model" - to "issue management models" which endeavour to establish mutual recognition and accommodation of change among client and the change agent.

The theoretical framework of this research is broadly based on appreciative systems (Vickers 1983; Checkland and Casar 1986) and an action research methodology (Lewin, 1946).

The focus of the research was a nomadic community in Iran, the "Ghareghani", a bonkoh (sub-clan) of the Qashqai tribal confederation in South Western Iran all of the different government departments which were involved with nomadic issues at the National, Provincial and District levels.

Fieldwork was carried out using ethnographic research methods, essentially participant observation (Spradley, 1980) and semi-structured interviewing

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(Goldman and McDonald, 1987) .Semi-structured interviews were used to map out patterns of meaning across time: Records were made of the historical context; The phenomenological data (based on experience and action) was coupled with the hermeneutic data (how the family members make sense/interpret their experience) these data sets were then analysed and interpreted under various category headings which now follow

Perceived Problems;

The traditional view of nomads held by government agencies and academics are:

a)That nomads are responsible for natural resource degradation, such as , soil erosion because of over-grazing of natural pastures .Soil degradation is a major problem in Iran. Soil erosion has increased by 250% between 1981 and 1991.

b)That there is a very low level of literacy (less than 23% among all nomads and even worse among women ,which is less than 17%) and limited health and hygiene services.

c)That nomads are not responsive to government control .Politically their capacity for independent action had been a major concern (Lambton, 1954). This was particularly true during the Pahlavi period.(particularly in the first stage of State formation)

d)That natural resource management is poor and levels of productivity achieved are low.National needs for animal products for consumption and export are high.

Nomads are less than three percent of the total 61 million population of Iran, but they control 30% of the livestock. They are major providers of meat, wool and dairy products. Despite the perceived environmental costs of nomadism and the poor quality of nomadic life many government officials recognise the fact that the economic output of nomadism is achieved at very little cost to the government and it could be increased through more efficient production.

The historical or traditional response to the perceived problem

During the last decade, and largely on equity grounds, the Iranian government has put considerable effort into providing infrastructure and basic services to nomads. In the same period the government has made considerable efforts (at great cost) on natural resource reconstruction.

These welfare and environmental efforts have involved the following elements:

(1) Technologically-based projects and advisory services in natural resource management and community development (range management projects, education, health and veterinary services).

(2) The establishment of new organisations (the Organisation of Jihad-for-reconstruction, now a ministry, the Organisation of Nomadic People of Iran (ONPI), the forest and Range Organisation (FRO), Nomadic Councils and Higher Council of Nomadic Affairs) and legislation (nationalisation and privatisation of pasture).

(3) Research on nomadic issues (first nomadic census,1987, two national seminars on nomadic issues, and the first International Conference on Nomadism and Development,1992).

Despite considerable allocated efforts and resources, no adequate solution has been found to the continuos problem of nomadism and government's efforts in these directions have not been particularly successful. Active nomadic support for the uptake of government-initiated activities has been limited, including settlement programs and successful range management project have been limited, resulting in continued natural resource degradation.

The problems in context;

The nomadic way of life and its associated problems could be considered from a different number of prespectives; one is an ecological view which sees nomadism as a disruption to the balanced ecosystem. The other point of view is that of an economic enterprise manipulating resources and products, to meet the needs of a market. There is political perspective, which sees nomadism as a powerful and sophisticated socio-political system with the potential to pertibate existing processes of power and control. Finally it may be seen as a community which is a victim of inequity .
Given the diffrences in perspectives it is suprising that there are not more different aproach to nomadic issues.

Attempt to deal with the perceived problem are traditional. The tradition can be termed "rationalistic" because of its emphasis on particular styles of consciously rationalised, simplified and standardised discipline of thought and action. Most often there is no distinction made between the possible understandings of material and biological phenomena.
The most common reductionist mainstream approachs are:

(a) the reductionist view point and analysis, which neglects the diversity, and complexity of the different dimension of nomadic life as a whole.

(b) the mainstream view which is to provide solutions to problems confronting nomads, based on their interpretation, rather than explore and develop shared concerns with the nomads themselves.

Approach to Fieldwork

Fieldwork was carried out using ethnographic research methods, essentially participant observation (Spradley, 1980) and semi-structured interviewing (Goldman and McDonald, 1987) .

Semi-structured interviews were used to map out patterns of meaning across time: Records were made of the historical context; the present-to-hand experience; and the anticipated context, the future. The phenomenological data (based on experience and action) was coupled with the hermeneutic data (how the family members make sense/interpret their experience) to constitute the contextual research focus . Proceeding along a parallel and dynamically interrelated path was the mapping of patterns of analysis constructed from social, ecological, and nomadic events.

The research focused on a nomadic community in Iran, the "Ghareghani", a bonkoh (sub-clan) of the Qashqai tribal confederation in South Western Iran and all of the different departments of Govt who engaged with that particular community. .

The bonkoh was thought an appropriate level for study because, it is territorially identifiable and it acts as a system, for purposes of environmental management., and for a number of other purposes.

Government agencies, which were involved with nomadic issues at the National, Provincial and District levels and were considered as part of the research field.

Identified Nomadic Issues

The concerns of the Ghareghani can be grouped under three major headings.
1. Issues concerning family welfare
This group of issues included: unpredictability and uncertainty of the future for themselves and their children, the poor financial returns of animal husbandry, dissatisfaction with the hardships of nomadic life in general and in the time of migration in particular. Even relatively wealthy families with larger than average herds find that income from nomadic livestock production is inadequate without external supplementary income

2. Issues concerning the wider nomadic society
One major concern of Ghareghani is the absence of any formal socio-political structure which can manage nomadic activities or, at least, act as a mediating structure between nomads and government agencies. They say "We are as a herd of sheep without any shepherd". The movements of groups during their annual migration and the wide dispersal of camps at both summer and winter pastures make access to government services very difficult. Electricity, water supply, social welfare services and health services are strongly desired by the Gharekhani. Education is particularly desired, as it is seen as being essential for the future of the next generation. Animal husbandry is seen to be a complex and managerially demanding task, because of the need to respond to a large number of variable factors outside nomadic control (market prices, security, rainfall). There is considerable dissatisfaction with the high level of insecurity associated with nomadic livestock production and the right of pasture ownership.

3. Issues outside the control of nomads

A major set of concerns revolved around factors seen to be beyond control. Consistent with a strong belief in God as the controller of nature, the vagaries of the environment and natural disasters were considered to be beyond human control. On other levels market prices were seen as being external and control of various services and pasture ownership were seen as being in government hands. Thus, there was a significant sense of powerlessness. Sedentary society were not seen as having the same level of powerlessness.

The increasing encroachment of sedentary society (both settled agriculturalists and urban people) onto pasture lands and migration routes was a source of great anger and frustration.

Adjustment Strategies

The Gharekhani have both short term and long term responses to external factors. The long term strategy of the majority was likely to be the abandonment of nomadic life. Sedentarisation was seen as the only alternative, for escaping the problems of nomadic life. The concern with education was part of this response - a preparation for eventual settlement. Those who ultimately expect to settle attempt to maintain grazing rights for as long as possible. Grazing rights were seen as the only collateral they had. Investment in land for agriculture was beyond their means.

Those Gharekhani with access to relatively large winter pastures seemed likely to continue a nomadic lifestyle, providing they could obtain some government support and supplementary income.

Short term responses revolve around risk management. Investment in productive property such as houses, vehicles (for haulage and carting) and gardens provide alternative income.

Employment in urban areas and in seasonal work also provides supplementary income.

An increasingly common strategy for risk management was a practice called nim-sodi in which nomads under contract act as shepherds for sedentary people. The nomads receive an agreed share of profits from this arrangement. The livestock owners receive the balance of profits and carry the risks associated with the capital investment. The Gharekhani felt that this practice reflects negatively on their status and were reluctant to discuss these arrangements openly.

Research Outcomes

Examination of the concerns of nomads lead to several observations:

There was a diversity of concerns even within a relatively small group of nomads. . This diversity of views partly reflects different levels of risk for more and less prosperous families and availability of winter and summer pasture. Other individual factors also intervene, including personal preferences, location of relatives, age of children and so on. Government agencies tend to prefer relatively homogeneous policies and programs.

The Gharekhani, in contradiction to stereotypes, do not wish to resist the benefits of settled life in the form of welfare and other services. They cannot however, make proper use of these services while pursuing nomadic livestock production, unless the mode of delivery of services is adjusted.

The nomads share the government's concern regarding degradation of range lands, but they saw this as one of many factors which are impinging on their future lifestyle.

The overwhelming concern was the sense of powerlessness over economic wellbeing in the present, and in the future.

The government was concerned with land management. Their continued attempts to involve the nomads in land management activities lead to frustration by both the government and the nomads. The government officers did not recognise that soil conservation and land management is seen as a low priority problem by the nomads.

The problem may be generally stated as a mismatch between what is scientifically or politically known and is technically feasible, and what is current practice.. . The new way of organising the society should be exposed to the nomads, and the new technology should be transferred to the end-user with appropriate consultation.

Improving the Problematical Situation

It was necessary to identify the differences between major groups and seek to accommodate them in order to begin to build a collaborative working arrangement. Activities that will lead to improvement are listed;

Arrange discourse to enable both nomads and government agencies to recognise each other's needs and priorities.

Government services must be delivered differently in order to meet nomadic needs. Nomadic participation in the process of designing new modes of delivery seems to be the most practical way of achieving this. (A nomadic role in managing these services would also seem reasonable.)

Policy development and program implementation need to be able to deal with the diversity of perspective and differing needs within the nomadic population.

Some of these desirable outcomes may be achieved through systemic action research. The action research recommended is that based on the principles expounded by Argyris et at (1985).

The Improvement Strategy

Action research teams were formed which comprised members of the Gharekhani sub-clan and local officers of government departments concerned with nomadic issues and the researcher as facilitator. The team attempted as far as possible to recognise the differing interests and to negotiate positions acceptable to all parties. The results of the action research process can be summarised as follows:

A shared understanding of the different department projects.

Identification of the lack of harmony between different department activities and projects, mainly between community development and resource management plans.

The realisation of the lack of holistic view among each department's plans and goals
.

Recognition that, although the equity is one of the major goals for the government, the benefits of different projects have not been absorbed by poor families.

The nomads themselves have a particular plan for adjusting to the situation, awareness of these plans by the government is essential if any future collaborative action is to occur.

Conclusion

As the start of this work the researcher was confronted by ill-defined problem, and methodology did not guarantee a particular kind of result. The expected outcome was an exploration and an improved understanding of complex social reality. Using a participative rhetorical technique it was possible to identify problematical issues associated with nomadic life. The mismatch between the nomads perception of their problems and the perception by government agents was demonstrated.

Using the theory of appreciative systems,(Vickers 1986) it was possible to show that there were significant differences in attitudes and appreciations which influenced perceptions of the nomads and government officers. Differences in attitudes were resulting in problems of communication and were limiting collaborative action. The formation of action research teams led to collaborative inquiry and shared understanding of problems as well as exploration of strategies for joint action for improvement.

This work supports clearly the propositional conclusion of Checkland about systems methodology(Checkland,1981, p 20): "This work started by trying to use systems ideas in ill-defined problem situations. Its outcome is a system-based methodology for tackling real-world problems, and incidentally for exploring social reality . It lends support to the view that the latter is not a 'given' but it is a process in which an ever-changing social world is continuously re-created by its member. The implicit value system of soft systems methodology is that never-ending learning is a good thing."

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Session H STRENGTHENING AGRIBUSINESS

1. **Goals Assessment of Limited Resource Farm Households in Trinidad**
   Wayne Ganpat
   J. Seepersad

2. **Educational Needs for Enhancing Non-farm Activities and Entrepreneurship: A Case of Java, Indonesia**
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GOALS ASSESSMENT OF LIMITED RESOURCE FARM HOUSEHOLDS IN TRINIDAD

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Introduction

To act on the premise that farm households have one goal that is unalterable over time is to delink farming behaviour from wider human behaviour, and that is risky. Farm households behave in much the same way as other people do in the determination of the goals to be pursued towards maximizing welfare. Welfare is more than just financial ability to procure food, shelter and other material possessions. It also includes other intangibles such as status, prestige and upward mobility.

Indeed while maximization of the welfare of the family could be an umbrella goal of all household heads, there could quite possibly be a maze of competing goals existing within the household by its various constituents. The major goal or mix of goals to be pursued by the family as a unit or by specific individuals will therefore influence the decisions that are made at farm level and will be in line with their values, beliefs, abilities, motivations, resource levels and needs. Also, these goals may be quite fluid in the hierarchy as situations affecting farm family change, and a predominant goal at one point in time may become a secondary goal in the mix at a later time.

Merrill Sands (1986) lists some of the goals which have been found frequently to have high priority in small farm households as profit maximization, cash maximization, subsistence security, flexibility, and long term economic stability. Gasson et al. (1988) in listing another set of household goals state that the goals linked to securing independence, intrinsic work satisfaction and maintenance of sufficient leisure time are often ranked by farmers high in their order of goals. In developing countries as the drive to develop suitable technologies and refine transfer processes ascends on national agricultural agendas, it is important that less speculation and more exact determination of the goals of intended beneficiaries be done.

Purpose

Firstly this paper presents a framework for, and an approach to the assessment of goals of limited resource farm households using a practical tool and simple analysis.

Secondly, it attempts to link a more precise knowledge of goals with more defined and appropriate educational strategies.

Methodology

The process of goals assessment for the sample involved two (2) steps, namely, development of goals and ranking of goals.

Step 1: Development of Goals

The goals that existed within the farming system were discerned and then clarified through a process of informal dialogue with the key informants in the area under study. Researchers, extensionists, agro shop dealers, buying agents and selected farmers were all interviewed separately by the researcher. From the wide variety of goals that were thought to exist, a short list of six (6) most common goals were selected for evaluation. The goals appeared to be a mix of economic and social goals, and were reworded after a formal pretest to ensure similar understanding by all respondents. They were listed as:-

1. To acquire more material possessions.
2. To improve the quality of life of the family.
3. To make the most income.
4. To satisfy family food needs and get extra cash.
5. To increase the size of the farm.
6. To maintain family customs.

Step 2: Ranking of Goals

The method of paired comparisons was used to determine the goal hierarchy among the targeted farmers. The method is reviewed (Bradley, 1976) and recommended for its practical simplicity, and was also used successfully to both rank order goals, and at the same time select the primary goals of a specified target of limited resource farm families (Harper and Eastman, 1980).

In this test, a list of all possible pairs of goals was presented to each respondent, and they were asked to select their preferred goal from each pair. The assumption is that respondents' appraisal of goals will reflect internal agreements and are homocentric to the family unit.

The numbers of pairs of goals was determined by n (n - 1)/2 where
n = number of goals to be ranked. Thus for the six (6) generalized goals used in this study, fifteen (15) pairs were developed. An example is: "Would you prefer to make the most income or to maintain family customs"?

For this study one hundred (100) limited resource farm households who farmed one hectare or less of land were selected by a simple random sampling procedure from a population who were similar in many circumstances e.g. limited access to credit and land for expansion, low ability to influence the decisions of agricultural organisations, constraints to increased production, outmigration, system of production etc.

The results were summarized into a frequency matrix showing the number of times each goal was preferred over the others by the respondents. A summary of the table provided the rank order of the goals as they existed among the households investigated.

Scaling and Scoring Procedures

Scale values were developed using the procedure reported in Edwards (1957) in order to place the goals along the relative continuum, which appeared initially to stretch from economic goals at one end to social goals at the other. It involved conversion of the number of times each goal was preferred over the others into proportions. Then, the proportions for each goal were added together and translated into scale values.

To obtain the goal orientation of each household, i.e. where each lies along the continuum and to develop a score, each respondent was asked to select his two (2) main goals from a random presentation of the six (6) goals. A respondent's score was the average of the scale values of these two goals. It is assumed that an individual who is more oriented towards economic goals would be more likely to make a choice at the end of the scale where economic goals lie and vice versa.

Supporting Data

Some other characteristics of the farm household were also assessed as part of this study in order to examine linkages, to interpret the goal hierarchy developed and to suggest possible extension educational interventions. The characteristics determined were, household size, type, and stage of life cycle development, level of education of households' decision makers, land tenurial arrangements, length of time in farming, time spent on- and off-farm, and children's activities on farm.

Results and Conclusion

Characteristics of the households

Data collected revealed that a slight majority of households comprised less than 4 members, with 42% having between 5 - 8 members. The overwhelming majority (78%) consisted of nuclear type households, consisting of father, mother and own children only, and were in the middle stages of their life cycle development where the children have left school and are working either on or off the farm. The data showed an average of two children supporting the activities on the farm on a part-time basis.

Level of education data, as assessed over the extent of formal education received by both respondent and spouse, revealed that the majority (57%) had at least a medium level of education (primary school level) while 23% had a high level (both secondary school level education).

Only 35% of the households owned the land on which they farmed and were thus entitled to use it as collateral for loans etc, all the others had some insecure arrangements to farm. The sample revealed an experienced farming community, 70% being involved for more than 10 years and with 40% more than 20 years. In spite of this however, only fifty-five percent of the sample were full time farmers, the others having some other form of employment off the farm.

Goals of the Household

The F matrix (Table 1) summarizes the ranking of the goals assessed from the sample of limited resource households. The number in each cell indicates the frequency with which the goal stated in the column was preferred over the goal stated in the row. Reading across the table, the numbers in a given cell indicate the frequency with which the goal represented by that row was not preferred to the goal represented by the given column.

The totals of the column represent the ranking of the goals by the sample of one hundred (100) limited resource households. The columns have been arranged so that goals appear in ascending order.

Table 1 shows that within the sample the preferred goals were directly associated with money. It shows that "To satisfy family food needs and get extra cash" is the most preferred goal among farmers. "To make the most income" is ranked second by farmers. Goals stated in non-monetary terms like "to improve the quality of life for your family" and "to increase the size of your farm" follow third and fourth respectively, behind the goals directly linked with money. Within the sample, "to maintain family customs" was the least preferred goal.

The scale values developed according to the procedure described in the methodology are also indicated on Table 1. The calculated values range from zero (0) to two (2), and confirms that the farmers' goals lie on a psychological continuum which involves a non-economic orientation at one end of the scale, passing through various stages of the psychological inclination, to economic orientation at the other end of the scale. Alternatively stated, it means that farmers goals stretch from traditional, subsistence orientations, passing through various stages of development, to full commercial orientations.

Subsistence --------> Semi commercial --------> Commercial

0---2

Non-economic Economic
Orientation ---> Orientation

TABLE 1: F Matrix and Rank of Goals for One Hundred (100) Limited Resource Farm Households

F Matrix	To maintain family customs	To acquire more material possession	To increase the size of your farm	To improve the quality of life for your family	To make most income	To satisfy family food needs and get extra cash
To maintain family customs.	-	81	97	96	100	96
To acquire more material possessions.	18	-	74	85	93	96
To increase the size of your farm.	0	25	-	83	70	80
To improve the quality of life for your family.	2	15	16	-	64	69
To make the most income.	1	8	32	37	-	57
To satisfy family food needs and get extra cash.	3	4	18	32	43	-
TOTAL	24	133	237	333	370	398
RANK ORDER	6	5	4	3	2	1
SCALE VALUES	0	1.2	1.7	1.86	1.92	2.0

The score for each household as calculated from the mean of the two goals preferred most from the set of goals, is regarded as the linear transformation of the subjects' position on the psychological continuum on which the original statements were scaled. The frequency distribution of the goal scores for the sample is presented in Table 2.

TABLE 2: Distribution of Goal Scores of 100 Households

Scores	% of Households	Cumulative %
1.45	1	1
1.60	1	2
1.78	1	3
1.81	44	47
1.85	28	75
1.89	1	76
1.96	24	100
	100	

The distribution shows that all the households have strong, economic goal orientations some stronger than others. Moreover, the data show that ninety-seven percent (97%) of all the scores obtained lie in the fourth quarter of the continuum, with twenty-four percent (24%) obtaining scores of 1.96, close to the maximum score that is possible to be obtained.

The scores were categorised into late, very late, and full economic stages of economic orientation. The distribution shows that only three percent (3%) of the sample are in the late stages, the majority (72%) are in the very late stages, and twenty-five percent (25%) are in the full economic stage.

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                          1    1.45          1.78                  1.89
0 . . . . . . . . . . .   *   . .   *  .   * . .   *  . .   *  . .   * .  *  . .   *  .  2
                                     1.61            1.81    1.85        1.96

                                       3%
                                     < . . . . . >
                                      Late
                                                           72%
                                                    < . . . . . . . . . >
                                                       Very Late
                                                                                25%
                                                                         <  . . . .  >
                                                                                Full
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Educational Importance

Desire to learn is an important ingredient of a successful training programme and goals often distill this desire.

Since interventions are usually targeted at communities rather than at individuals, a knowledge of goals and the ordering of these goals on a community level would be beneficial in the selection of objectives and strategies. For example, no strategy will probably work if farmers' priority goal is "to get out of farming", whereas goals such as "maintaining traditions or family customs" hint at the need for a programme to probably alter processes in the affective domain. Where goals are positive and encouraging, the strategies would probably require a strong training programme to either add, replace or modify existing knowledge and skills. This was the case for the category of farmers used in this investigation.

Further, as educational programmes are prepared, knowledge of goals of the targeted communities can be used as a variable for disaggregation of communities into specific groups, either singly or in combination with other key variables such as age, stage of development, level of education, on/off farming patterns etc. Educational programmes can then be tailored to suit these very specific categories of audiences with a greater chance of success.

On a broader level, goals influence decisions taken, and if there is need by interventionists to modify or change a decision, then a prerequisite would be a knowledge of the prevailing goals in the system.

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EDUCATIONAL NEEDS FOR ENHANCING NON-FARM ACTIVITIES AND ENTREPRENEURSHIP: A CASE OF JAVA, INDONESIA

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EDUCATIONAL NEEDS FOR ENHANCING NON-FARM ACTIVITIES AND ENTREPRENEURSHIP: A CASE OF JAVA, INDONESIA

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Introduction and Purpose

The growing interest in non-farm activities, particularly in the context of densely populated economies is in response to the shortage of agricultural land, and limited capacity of the agricultural sector to absorb the growing rural labor force[2](1). Using the population censuses and their respective definitions of rural, Haggblade and Hazell (1989) have calculated that non-farm enterprises account for 26 percent of primary employment in Asia (2). More recently, enhancing small scale enterprises has been viewed as an effective way of increasing employment and equity objectives of developing countries. Development of small enterprises is directly or indirectly impacted by entrepreneurship. The subject of rural entrepreneurs, however, have been inadequately researched (3). Important questions remain about entrepreneurship such as: What can communities do to promote entrepreneurship? What can be done to support local enterprise development? and how do government affect the entrepreneurial climate and what types of enterprises develop under different conditions?

Despite the potential role of non-farm activities and entrepreneurs in rural areas, relatively little is known about small enterprises in developing countries, particularly those enterprises at the lower end of the spectrum (1,2). This is partly due to a lack of information about non-farm activities and small enterprises and entrepreneurship in rural areas. This paper is designed to fill some of the missing information about small enterprises and entrepreneurs. The major purpose of the paper is to provide information and discuss the nature, type, and characteristics of non-farm activities in selected areas of Java, Indonesia. The paper also examines entrepreneurship in the context of rural Java and discusses educational/training needs for the development of small scale enterprises.

Methodology and Study Area

The island of Java was selected for this study. Two provinces in Java, Central Java, and Yogyakarta were randomly selected from the list of provinces in Java. One village from each of the selected provinces was selected purposively. The two villages selected were: Batur in Central Java and Semanu in Yogyakarta. The two selected villages are quite different from each other in terms of location, economic and social backgrounds. It is hoped that this diversity will provide a wider and more comprehensive insight into the nature and factors affecting the development of non-farm activities in Java.

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[2] Non-farming activities are diverse and difficult to define. They include a variety of jobs in services, commerce, construction transport, repair and maintenance, and processing.

The data for entrepreneurs/enterprises were collected using personal interview method. There was no list of existing enterprises/industry at the village or district level. Therefore, a sampling frame could not be developed. The village heads in selected villages, however, were able to provide some information on approximate number, location, and types of enterprises in the villages. Considering the diversity and the expected number, it was decided to survey 100 existing enterprises in each of the two selected villages. This represents more than 80 and 90 percent of all enterprises in Batur and Semanu villages respectively. The data were collected using a questionnaire and by interviewing the owner or manager during January 1992-March 1993.

To contrast the conditions in the two villages, general characteristics are presented in Table 1. Batur, the village selected in Central Java province is located about 35 km. east of Yogyakarta city. Yogyakarta is a large tourism and educational center. The village is easily accessible through road and railroad from Yogyakarta. The other selected village Semanu is located about 55 km. Southeast of Yogyakarta city. The village lies in the hilly upland area in southern Java.

Entrepreneur and Entrepreneurship

The word entrepreneur is difficult to define (3). Terms like innovative, flexible, dynamic, risk-taking and creativitytive frequently used to identify entrepreneurs. It is however, impossible to translate these abstract concepts (of an entrepreneur) in an objective and operational criteria (4). An entrepreneur is one who operates independently within a social and economic system to organize and manage a business activity in an innovative, aggressive style. The entrepreneur may or may not be self-employed (5). Entrepreneurs are generally thought to be the founders and owners/operators of small businesses. A knowledge of entrepreneurship is a prerequisite for developing strategies to encourage business and job creation in rural areas. In the entrepreneurship literature, few topics have been so widely discussed or researched as characteristics of entrepreneurs (3). These characteristics may be grouped into four broad categories - demographics,behaviors, attitudes, and background/experience. The entrepreneurial activity is affected by these factors. However, as shown in Figure 1 the relationship between these characteristics and entrepreneur is not direct. This is reflected in the figure by zigzagged rather straight lines. Demographic characteristics influence entrepreneurship indirectly, via the behaviors and attitudes. The entrepreneur is responsible for the business start-up, but the choice to initiate the business is influenced by the conditions and support provided by the community. Job generation process is also affected by the other environmental factors. These are: economic conditions, industry characteristics, legal, and cultural factors(3). The entrepreneur can identify opportunities and take aggressive, innovative action to capitalize on opportunities.

There seems to be general agreement that entrepreneurs are not born but are created by education and environment (6). Education involves the dissemination of knowledge of general subject matter and how specific skills including how to start and operate a business. It is not possible to simply teach a series of topics and expect people to become entrepreneurs. Other factors must be present in the individual from previous education and experiences. Education helps the potential entrepreneur realize the opportunities which may exist. Therefore, leaders and policy makers can play major role by shaping the education to develop entrepreneurship.

Proprietors, Location and Type of Enterprises

A very large majority (96%) of selected enterprises were small-owner operated. Of these, 82% had male owners and 18% female owners. In both villages, 95% or more of the respondents were owners. The average age of proprietors in the sample was about 44 years. Proprietors in Semanu were relatively younger (42 years) compared to 46 years in Batur. Almost 88% of the enterprises in the sample were started "from scratch" by the respondents, however, a higher percentage (92%) in Semanu and a lower (83%) in Batur. Most proprietors who responded (70%) financed the start-up with funds saved by themselves or the family. The percentage however varied from 66% in Batur to 73% in Semanu. Other sources of initial capital were bank credit and credit from others.

Almost 23% of proprietors in the sample had not completed primary school and another 34% had no more than a primary school education. The level of education was higher in Batur with a mean of 7.2 years than in Semanu (6.2 years). Only about 3% of respondents reported having had some amount of formal training, either technical (vocational) or managerial. However, 32% respondents in Semanu and 19% in Batur reported learning skills from a parent. In Batur 52% reported learning by doing (apprenticeship) which was more than double the percentage in Semanu.

Overwhelmingly, enterprise activity in selected villages is centered in the proprietor's home. Selected enterprises in two villages are grouped in six major categories (Figure 2). In both villages food processing was one of the important enterprises in terms of numbers. However, beyond this, the similarity ends. In Batur there are more manufacturing type enterprises whereas, in Semanu more than half of the enterprises are handicrafts.

Employment and Female Employment In Selected Enterprises

In general, modernization of agriculture has displaced more female workers than male workers in Indonesia (7). Many of the displaced female workers have found jobs in small scale industries. Only 18% of the enterprises in the sample are run by women, but almost 30% of employees working were female. The number of enterprises employing workers varied from 74% in Batur to a low of 39% in Semanu. The remaining enterprises are run by the entrepreneur himself/herself and in most cases with the help of family members (spouse and children). Most of the enterprises (77%) hire less than 10 employees suggesting the prevalence of very small enterprises. Enterprises in the sample employed on an average (7) male workers and (3.5) female workers in

Batur 3.6 and .7 respectively in Semanu. The proportion of enterprises run by women differ by sector. Female run enterprises are most common in food, beverage production, and weaving apparel, bamboo weaving, and retail trade sectors. Other sectors, such as manufacturing, metal production, wholesale trade are dominated by male proprietors. In addition to paid workers, 58% of the enterprises in Batur and 79% in Semanu used family workers to operate the enterprise. On an average, enterprises used (2) family members per enterprise. Also, on an average more female family workers (Average = 1.1) were employed than male (0.87) workers.

Capital, Wages and Net Income

Selected enterprises demonstrate a considerable degree of dynamism. The capital and employment in these enterprises has grown from its beginning until the time the survey took place. The average initial capital for an enterprise in Batur was Rp. 2,359,934 which increased to an average of Rp. 5,159,571. In Semanu the initial capital was much lower Rp. 225,973 and increased to Rp 377,754 an increase of almost 67%. Average wages per day of Rp. 2,217 in Batur were relatively higher than Semanu's of Rp. 1,918. The enterprises with highest net profit per month were Textile in Batur and Blacksmith in Semanu. It is important to note that in more than 30% of the enterprises bought their inputs from the local agricultural sector. With respect to forward linkages, 99% of the surveyed enterprises sold in the local domestic market with less than 1% selling to urban commercial businesses or for exports.

The Education And Training Toward Developing Entrepreneurship

A society can do much to stimulate or inhibit the development of entrepreneurship. One important method of stimulating entrepreneurship is through education. Micro and small scale enterprises have special characteristics and these must be considered before developing any plan. The following assumptions may be made regarding the training and development of entrepreneurs: 1. Entrepreneurs perform critical roles and behaviors in resource combining activities and these can be learned or altered; 2. Entrepreneurs can be identified by their potential for success; 3. Potential entrepreneurs can be taught tools, skills, concepts and experiences through various learning opportunities; 4. Hands on learning process is important.

Programs developed for entrepreneurs should be locally oriented as one program may not work in all regions. Educational programs for increasing entrepreneurship should be part of the overall plan of development of the local area. Following is a list of principles and guidelines that may be used to develop successful strategy for achieving overall objectives: 1. Efforts be made to emphasize a strong family enterprise system in which each entrepreneur is the owner/decision maker; 2. Self-reliance be enhanced; 3. Efforts of various agencies should be coordinated/consolidated to integrate activities; 4. Shift emphasis away from localities competing which each other to an approach that makes local firms more competitive; 5. Target infrastructure supports to industries that can sustain competitive advantage; 6. Provide marketing and business management support to enterprises; 7. Set up education/training facilities; 8. Encourage entrepreneurs to use technology that is appropriate to their capability; 9. Educate women and children; 10. Encourage formation of a system for disseminating information.

Conclusions and Implications

The evidence presented in this paper for two distinctly different villages show that in quantitative terms the importance of non-farm activities for the rural economy is very substantial. The non-farm activities depend on several factors including agricultural production market, infrastructure, availability of credit and general level of education and skills. In Semanu, the less-developed village in the study, the non-farm activities consisted of rudimentary cottage manufacturing for local domestic use or the local market, petty trading, food vendors, and services. These activities require little capital and skill; the market also is usually limited and the consequence is low productivity and/or returns. In Batur, non-farm activities were not limited to those involving low capital and provided jobs with higher wages and required relatively higher education and skills. Examples of these non-farm activities are: manufacturing (iron works), tiles/molds, and textiles. This suggest duality in the growth of non-farm activities in Java.

Entrepreneurs play an important role in the development of non-farm activities. An entrepreneurial environment appears to exist in one village (Batur) where there are available role models, rewards for risk-taking and a relative absence of barriers. But the second village (Semanu), which is still traditional, lacks entrepreneurial environment. Government policies and community efforts can facilitate entrepreneurship by removing those barriers that currently inhibit growth and development. Clearly, if non-farm employment has to play an important role in rural development of Java, there is need for a transition from the "odd job" regime to more productive employment. Programs that identify and provide a single missing ingredient necessary for enterprise success could be very useful. Another precondition for a sustainable growth in non-farm activities is a dynamic agricultural sector; the non-farm and the agricultural sector have to grow in a mutually reinforcing manner (8). Women dominate many of the non-farm activities. To facilitate their contribution, will require assistance agencies and government explicitly recognizing the key role to be played by women.

If rural enterprises are to achieve their full potential for employment and income generation, policy makers will need to redress common pro-urban policy biases as well as policies that discriminate against small rural non-farm firms. Focus of research as well as policies and programs to increase employment and income in rural areas needs to be shifted away from land-based crop production systems and more towards diversification of agriculture and a variety of ancillary activities that the poor can undertake with or without land. Commerce and services may be the key growth sectors deserving more attention (9). To maximize benefits at the local level, attention should be given to a careful planning of crops and livestock enterprises, marketing systems, and the location of agribusiness including agro-processing plants

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TABLE 1. GENERAL CHARACTERISTICS OF SELECTED VILLAGES
CHARACTERISTICS

	BATUR	SEMANU
.Location	About 100 m above sea level 35 km from the City	150-200 Above 55 km. from the
City		
.Morphology	Flat	Hilly
.Land area	1.03 sq. km	15.63 sq. km
.Rainfall (mm)	2101	1585
.Irrigation system	Irrigated	Rainfed
.Cropping system	Single crops	Mix crops
.Land distribution	Unequal	Less unequal
Gini Ratio	0.7874	0.6095
.Population (1990)	2863	15,391
.No in household (Av)	3.7	5.6
.Households below poverty level	14%	21%
.Population density (person/square km)	2771	984
.Population growth (1980-90)	1.18	0.39
.Migration pattern	Mostly in-migration	Mostly out-migration
.Labor force involved in industry	25%	2%
.Economic infrastructure	Good	Fair
.No of banks	2	0
.Access to market	Good	Fair

Sources:
1. Regional Bureau Statistics, Klaten and Gunung Kidul, 1992.
2. Household Survey, Batur, and Semanu 1993.

Factors Influencing Enterprenur And Business setup

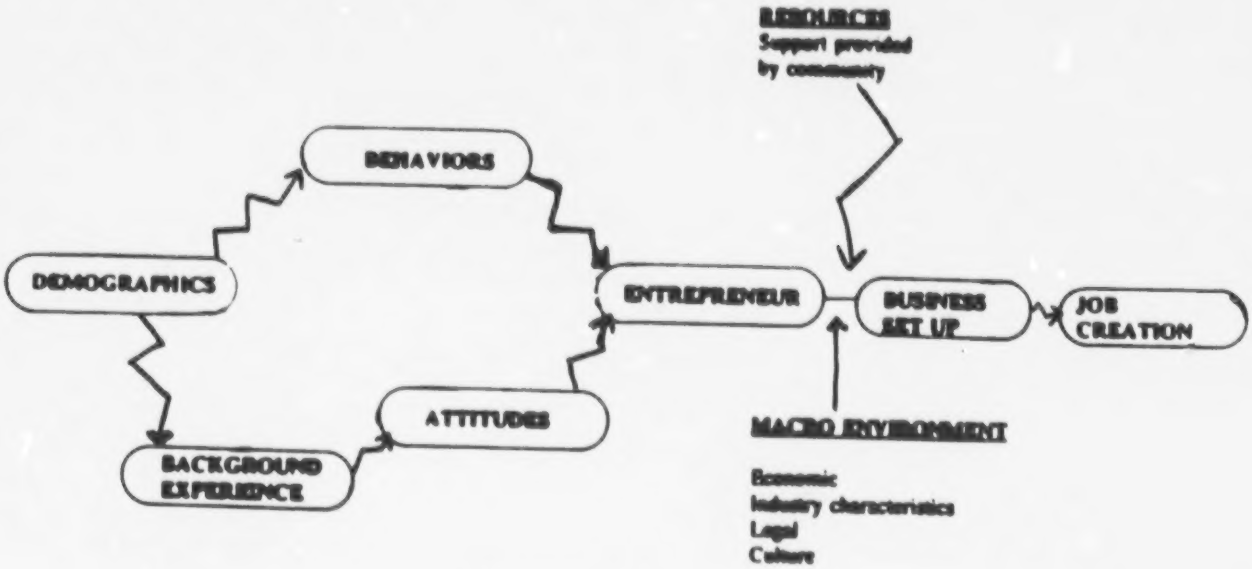
RESOURCES
Support provided by community
BEHAVIORS
DEMOGRAPHICS
ENTREPRENEUR
BUSINESS SET UP
JOB CREATION
ATTITUDES
BACKGROUND EXPERIENCE
MACRO ENVIRONMENT
Economic
Industry characteristics
Legal
Culture

Figure 1

Distribution of Enterprises by Groups Selected Villages

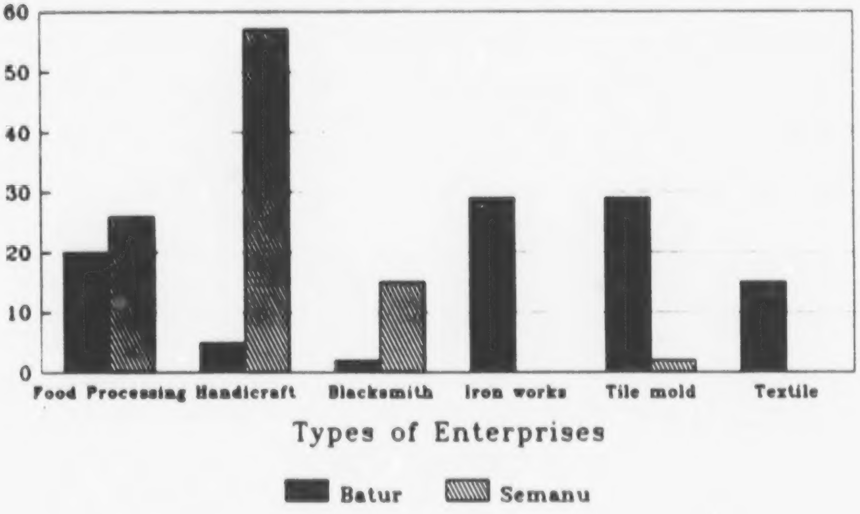

Figure 2

In Uzbekistan, is it Farm Management
or FARM **Management?**

Association for International Agricultural

and

Extension Education

Arlington, Virginia, USA

24-26 March 1994

by

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Introduction

Since its independence from the USSR in 1991, the Republic of Uzbekistan in Central Asia has set a policy to privatize collective and state farms. Its earlier, industrial-type agriculture had emphasized production of raw cotton for export. Consequences have included severe damage to land, water, human health, and communities. (Feshbach & Friendly, 1992).

The privatization process, overseen by the Ministry of Agriculture (MOA), provides in-depth, noncredit farm management short courses for privatizing farmers. The MOA has contracted with the country's leading agricultural university -- Tashkent State Agricultural University -- to coordinate the series of short courses.

USAID's volunteer Farmer-to-Farmer (FTF) Program, coordinated in Uzbekistan by Winrock International (WI), has offered to supply volunteer specialists from the U.S. to supplement the instructional faculty. Our team identified areas in which WI's FTF program volunteers could be targeted effectively.

Purpose:

This paper introduces what we discovered:

1. a much larger conception of "farm" than we had anticipated, and
2. a qualitatively different view toward "management."

Methodology

In August 1993, the three-person Farm Management Training Consultant team* from the U.S. interviewed a wide spectrum of stakeholders in Uzbekistan: authorities in the MOA, local government officials, national bank officers, university administrators and faculty, and farmers privatizing their assets and management. Throughout, we read government and farm-level documentation of emerging policies.

Results and Conclusions

A Broader Conception of "Farm." Before our arrival, our thinking was oriented toward training for individual farmers to enhance on-the-farm productivity. Soon we were introduced to the Uzbek's intent since independence to also (a) improve the quality of inputs, (b) initiate value-added processing of farm products and by-products, (c) more carefully consider the well-being of farm families, the viability of farm communities, and the quality of their natural environment, and (d) search for interdependencies among all these components.

---

*Our well-balanced team included the two authors and John A. Taylor, Agribusiness Manager, Prairie du Sac, Wisconsin, 53578.

Orientation	Farm Systems		
	Inputs ⇒⇒	"Farm" ⇒⇒	Outputs
Individual	2	1. We started here	
Family			3
Community	4		5

Here are illustrations of our growing awareness of what Uzbeks consider important in other cells above:

2. On the input side, we discovered how eager Uzbek vegetable farmers were to acquire and test improved genetic materials, how anxious dairy farmers were to produce higher quality forages and how intent grape growers were to reduce their input costs.

3. On the output side, we saw that in order to add value to their produce, farm families were acquiring small cotton weaving equipment and were teaching youth to fabricate socks, scarves, and mittens for export. Dairy managers asked us about small scale milk processing equipment that their families could operate.

4. We heard about the formation of new farmer-initiated and farmer-directed cooperatives to manage district level irrigation and fertilizer systems more efficiently.

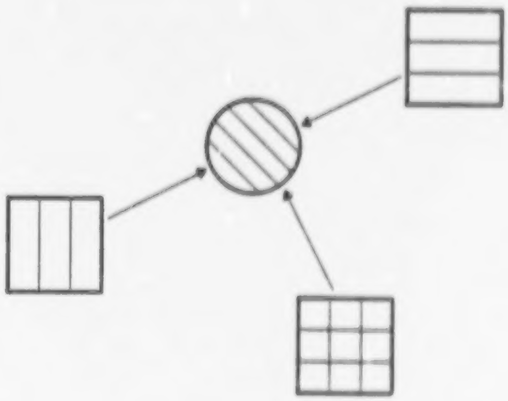
5. We noted that an established percentage of the profit from a private collective farm was allocated yearly to community-building investments.

Whereas we initially focused on training for individuals responsible for on-farm production, we soon acquired the Uzbek's perspective of "farm" that included the farm family and farm community and emphasized the farmers' management of new inputs and outputs.

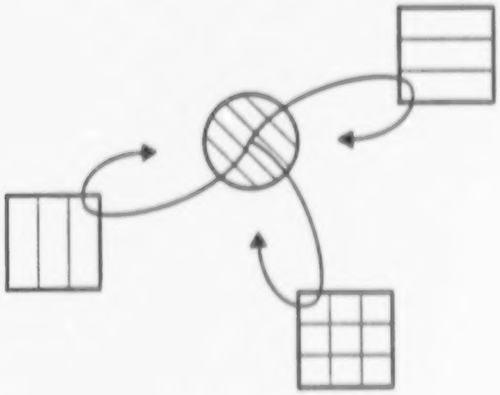
A Reorientation Toward "Management"

We also came to appreciate that Uzbeks clearly distinguished between (A) a "directive" and (B) a "management" orientation toward farming and intentionally chose to adopt the management approach:

A: Directive orientation in which farmers' decisions are dictated by multiple authorities, for example, local governments, ministries, lending authorities:



B: Management orientation to farmer-as-decision maker, in which farmers reach out for information and counsel to make entrepreneurial decisions:



The Uzbek's distinct shift from a directive to a management orientation to farming became apparent to us:

- as we talked with an economics instructor at Tashkent State Agricultural University, who is adapting a management-oriented curriculum,
- when, at a regional agricultural college, we interviewed a small group of administrators and faculty seeking to realign a discipline-based curriculum into useful management-oriented modules,
- during our conversations with local government officials who supported the development of farmer associations that assumed responsibilities formerly assigned to government, and
- as we walked the fields, vineyards and paddocks with farmers who, themselves, were learning to manage more effectively -- and proud of it!

In conclusion, we discovered that Uzbek agriculturalists had (1) broadened their perspective of "farm" to include management of higher quality inputs and value-added outputs, (2) deepened their outlook of farm to include farm family and farm community, (3) oriented their view toward the farmer as an entrepreneurial decision maker, and (4) began to explore ways for farmers and public authorities to cooperate in shifting from an industrial to an entrepreneurial agriculture in Uzbekistan.

Educational Importance

Integrating this larger view of "farm" and this qualitatively different conception of farm "managment" suggested direct implications for farm management education:

- First, the choice of farmers as short course participants. We recommended that farmers be selected who are willing and able to venture into whole-farm management responsibilities; and we suggested that teams of farmers be chosen.
- Second, design of the curricula. We suggested that Winrock International support on-farm demonstrations and experiments as a means of "instruction."
- Third, selection and development of Uzbek and U.S. faculty. We advised TSAU and Winrock to involve teams of faculty, advisors and consulting specialists from the US in on-farm assessments, demonstrations and experiments to develop the faculty's preparedness to teach whole-farm management.
- Fourth, relationships among all stakeholders in the nation's agricultural systems. We recommended that a problem approach -- a case method -- be used in teaching to facilitate the on-farm integration of the technical, financial, social and legal constraints always in flux.

In summary, our brief month as a team in Uzbekistan offered us instructive insights into the scope of Uzbekistan's "farms" and into her new orientation toward "management." These insights, in turn, helped us shape our recommendations for US support of farm management education in this newly independent Republic in Central Asia. We're eager to observe her progress.

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Bulgaria's Agricultural Land Reforms

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BULGARIA'S AGRICULTURAL LAND REFORM

by: James E. Diamond

INTRODUCTION

In Vice President Al Gore's address at University of Wisconsin Institute of World Affairs explaining the importance of President Clinton's trip to Europe and Russia ("When Europe Fights," 1994), he stated "The struggle to erase communism's scars and ensure democracy's success is not their struggle alone - it must also be ours." The People's Republic of Bulgaria, once Eastern Europe's most highly collectivized country, is currently in the throes of making a simultaneous transition from a centralized government to a more democratic Republic, and a state controlled economy to a free market economy. Located on the Balkan Peninsula, Bulgaria's economic transition efforts include privatization initiatives that span five broad areas: housing, small state and municipal enterprises, large state enterprises, agriculture, and financial institutions (Ross, 1991).

PURPOSE

The purpose of this manuscript is to document the observations made by the author during a recent visit to Bulgaria for United States Agency for International Development (USAID) to assist a group of entrepreneurs to organize a private agricultural consulting service. It describes the current status of privatizing Bulgaria's agriculture and its' people regaining ownership of their land. Land that was wrenched from their parents or grandparents during Josef Stalin's communist movement into Bulgaria during 1944.

METHODS

This paper evolved from synthesizing observations made in Bulgaria as a volunteer for USAID contractor, Volunteers in Overseas Cooperative Assistance, reviewing recent literature regarding Bulgarian Reforms, government reports, and several personal interviews with Bulgarian people.

POLITICAL DEVELOPMENTS

In July, 1991, Bulgaria's Grand National Assembly passed a new democratic constitution that created a system of government based on the separation of powers (Verona, 1993). Slower than other Eastern European nations to replace their communist governments, the people of Bulgaria brought to power its first non-communist coalition government after the elections in October, 1991. As a result, Bulgaria has implemented radical political and economic reforms. One of the important reforms evolved on 19 February 1990 when the Bulgarian government made public a decree granting farmers the right to choose their way of farming and the right to export their produce. Furthermore, no limits to the size of the farms and the creation of a private farmer's land was announced (Petkov, 1991). Although the transition has been difficult, especially economically, the public commitment to completing this process seems strong (Verona, 1993).

AGRICULTURAL TRANSFORMATION: THE LIQUIDATION PROCESS

Despite its lower priority, agriculture remains the crucial component to the Bulgarian economy (U.S. Department of State, 1993; Wagner, 1993; Petkov, 1991). During the past 45 years the state owned and controlled virtually all agricultural production, except for small family plots that were leased from collective farms and accounted for about 15 per cent of the cultivated land (Ross, 1991). The return of the land to the people has evolved into a difficult, complex, and time consuming process. The one basic question that has created the myriad of complexities is "Who gets the land?."

Gospoden Todorov (cited in Wagner, 1993), Chairman of the Yambol District Land Liquidation and Restitution Committee best describes how restitution of the land became so complex. According to Todorov "the communist government on 9 September 1944 put an end to the free development of the country, as Bulgaria became a satellite of the former Soviet Union." He goes on to say that since then, all economic, political, and even cultural matters were aligned with the former Soviet Union. One of the major transformations was collectivization in 1950. People were forced to give up their land to the socialist type cooperatives. The largest land owners and the most experienced farmers were not permitted to participate in managing the new cooperatives because they were "class enemies." The next step was consolidating the cooperatives into one big cooperative.

In 1970, the whole structure was transformed into huge "Agrarian Complexes." Each agrarian complex included 15 to l20 villages. This was a way for an elite nomenclature to be created in the farm industry. There was no clear picture of who was producing, no measure of productivity, and no accountability of who was spending the money. In 1975, a National Agrarian Union was formed that included at least one Regional Agrarian Union from each of the 28 regions.

Each step of consolidating the agricultural sector was aimed at and resulted in a dependence on the central state government and the communist party. All farm activities were reported to the regional communist party committees. Farmers in the villages were told what to seed and how much to produce. Selling prices were fixed by the government. The state purchased all farm production at a price far beyond what would likely be the market price. The state agricultural managers transferred capital to the central planning network that diverted agricultural capital to the industrial sector. Reinvestment and modernization of the agricultural cooperatives was neglected. Tilling, planting, harvesting, storing, and transportation was done by low paid people who had no interest in the final productivity and costs, so there were huge losses (cited in Wagner,1993).

A STRATEGY

The objective of Bulgaria's Ministry of Agricultural Development, Land Use, and Land Restitution is to privatize land ownership and agricultural input companies by fully decentralizing agriculture. This objective aligns with the broad goals of the 1990-91 reforms aimed at reallocating agricultural resources. At this writing, it appears that the main elements of a sound reform strategy are in place.

Complex Problems

The complex problems that have evolved by the strategy in part, is due to sensitive trade-offs between maintaining political support and implementing the reform. Transitional problems and political compromises threaten to undermine the reform process efforts (PHARE, 1992). Even though the government has adopted a strategy for accelerated land reform that is valid through 1994 (Staff, 1993), some local leaders and farmers from several localities tend to believe that this strategy will be prolonged into 1995 and conceivably 1996.

Macro-Economics

The success of the macro-economics program is critical for the agriculture sector. However, the agricultural reform efforts are being implemented simultaneously with attempts to stabilize Bulgaria's macro-economy, causing severe adjustment costs and delays. Policies that restrain agricultural development can lead to increased pressures for costly support programs. The agricultural sector has borne the burden of certain policy interventions aimed at managing prices of crucial commodities simultaneously with increasing unemployment, falling incomes, and rapid inflation. High inflation has resulted in soaring interest rates, placing severe constraints on agricultural enterprises.

The strategy in place is based on four premises, simplify and expedite the establishment of private property rights in agriculture and the food chain, complete the liberalization of prices and trade, promote a sustainable finance and credit system, and stimulate institutional support for a commercially viable agriculture (PHARE, 1992).

Establishment of Private Property

When the ownership of property rights are established, private farmers can confidently decide how to use their land and hopefully will lead to increased agricultural productivity and income. According to the Ministry of Agricultural Development, Land Use, and Land Restitution in November, 1993, 38% of the state controlled land has been returned to the people. However, even though many of the people have received documentation that they will receive back their land, they do not yet know its "exact" location because it has not yet been surveyed. Hence, the people cannot yet actually claim ownership to an actual plot of land or use their land to grow crops privately or as collateral for loans, because they do not have a deed showing a surveyed plot of land with its exact location.

Bulgaria's economy, future government policies are presently teetering on the completion of the main elements of the land reform process. Clear land titles and tradable property rights are essential for Bulgaria's transformation to a free market economy.

Sustainable Finance and Credit

Rapid inflation, high interest rates, and pervasive uncertainties have contributed much to the reluctance of commercial banks, agri-business companies, investors, and farmers from investing in Bulgarian agriculture. Uncertainties such as prospective markets, economic stability, government policies and regulations have deterred investment in agriculture. As of 19 November 1993, interest rates charged for long and short term loans at commercial banks ranged from 52% to 60%. Interest rates paid on moneys deposited into savings accounts were 40%.

The economic attraction to Bulgaria's strong agricultural potential has been disrupted by the reform taking place in the financial sector. Traditional credit to agricultural enterprises has declined because commercial lending institutions are reluctant to approve credit because land reform policies are incomplete and farmers have no collateral. Hence, the on-going reforms to stabilize Bulgaria's economy, restructuring, and privatizing the banking system are important to reducing the risks of production losses or bankruptcy in the "privatized" agricultural sector. Currently, there is a strong demand by private farmers for low interest loans. Farmers are not willing to pay the present interest rates that range between 52% to 60% for short or long term loans. They realize that paying interest at that rate can be the "recipe to failure."

EDUCATIONAL IMPORTANCE

This manuscript reflects progress made by the Bulgarian people since Bulgaria's Grand National Assembly passed a new democratic constitution in 1991 that created a non-communist government. This was a bold and ambitious development in a country dominated by a Communist government since the signing of the Yalta Treaty in 1945. Many issues have evolved since 1991 that conceivably could impact the future of this new and fragile democratic form of government. The status of Bulgaria's Agricultural Land Reform reported in this manuscript is useful for institutions of higher learning, private consulting companies, government and non-government agencies who are or plan to be involved with projects in Bulgaria or other countries in Eastern Europe.

CONCLUSIONS

Overall, it seems the Bulgarian people have a hidden optimism about their future. However, at this point, due to many uncertainties, they are somewhat reluctant to express their optimism. They seem to be perplexed as how they should function in a free market economy and do not understand its concepts. Entrepreneurs expressed a need for education programs in management, marketing, and economics as they relate to a free market economy.

The people seem to be insecure and unsure about the political and economic changes now taking place within their country. The slowness of the restitution process have caused uncertainty and insecurity especially amongst the rural people.

Agri-business companies and investors tend to be reluctant to invest in Bulgaria because of the uncertainties. Even though unemployment is increasing, incomes are falling accompanied with rapid inflation, the Bulgarian people do not want "gifts" from donor nations. Private Bulgarian farmers (both large and small) consistently indicated they need low interest loans for fixed and operating costs related to their farms. The people are eager to take over the former state owned and controlled agricultural industry, and low interest loans will contribute towards attaining that goal. However, the flags of caution must be raised to alert entrepreneurs that their eagerness can also be a detriment. There are components of a free market economy not yet in place and agricultural business ventures must be kept in perspective.

SUMMARY

Bulgaria has a tremendous agricultural production potential. It has rich soils that can produce high yields, adequate water for irrigation and dry land farming. The climate is conducive to growing wheat, barley, corn, grapes, fruits, vegetables, cotton, and peanuts. In Bulgaria there is an infrastructure to transport (roads, railroads, seaport) commodities to various markets, functioning food processing plants, well known agricultural research facilities, high literacy rate, and a well established education system.

According to Vice President Gore ("When Europe Fights," 1994), "Americans cannot afford to assume that the collapse of the Soviet Union permits the United States to abandon its leadership abroad, especially in Europe." He further stated that "The demise of communism in Europe provides cause for hope, but there is also a dark cloud on Europe's horizon. It is the threat of fiery nationalism, ignited by old resentments, fueled by economic frustration, and fanned by self-serving demagogues." This is why the Bulgarian people are finding it difficult to plan for the future. They need financial assistance and education programs to help them help themselves. Vice President Gore ("When Europe Fights," 1994) quite appropriately underscored the importance of Bulgaria's and other Balkan countries struggle to simultaneously reorganize their governments and to enter the free market economy by saying ". . . nothing is more important to America's security than the success of democratic and economic reforms in Eastern Europe."

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AN ASSESSMENT OF THE USE OF CONTACT FARMERS IN THE TRAINING AND VISIT EXTENSION SYSTEM IN NIGERIA

By

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Introduction

The Agricultural Development Project (ADP) system was initiated in 1975 in Nigeria as an integrated rural development strategy on a pilot basis at Funtua (Kaduna State, now Katsina State) Gusau (Sokoto State) and Gombe (Bauchi State). The success of these pilot projects led to its adoption, first on enclave basis, i.e. covering a few local government areas in states where they were located, and later state-wide projects were established with one in each state of the Federation and the Federal Capital Territory, Abuja. With the unification of agricultural extension services in 1991 in Nigeria, the ADP is now the sole government agency responsible for agricultural extension services to the grassroots level nationwide.

Prior to 1986, each of the ADPs attempted to implement the Training and Visit (T&V) system of extension in its "imperfect form" by selectively adopting a few of its features that could conveniently be implemented in each area. The result was that visits by extension agents (EAs) were uncoordinated and not regular, supervision was unsystematic, EA's training was not regular and there was a weak linkage between research and extension. Efforts to address these weaknesses in the extension service is partly responsible for the full adoption of the T&V extension system in Nigeria in 1986. One of the significant development that accompanied the full adoption of the T&V system is the mandatory use of contact farmers by extension agents in the dissemination of innovations.

The major assumption underlying the use of contact farmers in the T&V system of extension is that frequent contact between the EAs and all farmers in his domain of operation is not possible. Rather, the Ea's effort can be multiplied if he focuses on a small selected number of contact farmers in each farming group who are in-turn obliged to teach other members of the group the production recommendation taught them by the Ea. Elsewhere, Ewert *et al* (1993) affirmed that farmer-to-farmer extension can be more cost effective than use of professional extensionists, develop local leadership, build self confidence and promote more effective adoption of innovations.

PURPOSE AND OBJECTIVES OF THE STUDY

The T&V extension system is probably the most widely criticized extension approach, yet it is the most rapidly spreading system of extension particularly in developing countries where the World Bank finances agricultural development projects. Most of the criticisms against the T&V system centre around costs and sustainability (Howell, 1985), the huge personnel build-up involved in the system, (Cernea *et al ,1985)* and the use of contact farmers (Feder *et al* 1985, Howell 1982, Williams *et al* 1984). The use of contact farmers had been criticised on the ground that contact farmers were selected from among the powerful, wealthy, more literate, owner operator and large farmers, and that these group of farmers tend to monopolize extension services at the expense of the resource - poor and less privileged farmers.

Benor *et al* (1984) recommend that contact farmers should be carefully identified and selected to ensure that they are practising farmers, represent the main socio-economic and farming conditions in their group, willing to adopt recommendations and allow other farmers to observe their practices and explain the practices to them. Although the criticisms against T&V lingers on, not much is known about characteristics of contact farmers and their effectiveness in agricultural innovation transfer as it is currently being practised in the T&V extension system in Nigeria.

The objectives of the study reported in this paper therefore were to identify and describe the characteristics of contact farmers and examine their usefulness and effectiveness in disseminating agricultural innovations.

METHODOLOGY

The study was conducted at the Maigana Zone of Kaduna State ADP, Nigeria. For effective administration of the T&V system in Nigeria, each State ADP is divided into "zones" "Areas", "Blocks"., and "Cells", in descending order of scope as stated. The "Cell" is the domain of operation of the EA. Every "cell" is divided into eight sub-cells and there are ten contact farmers in each sub cell, so that every EA has at least eighty contact farmers whom he visits at least once in a fortnight to discuss production recommendations.

In the Maigana zone of Kaduna state ADP, there are 216 cells and about 17,280 contact farmers. The primary data for the study were collected by structured interviews of contact and non-contact farmers between April and July, 1992 using pre-tested structured interview schedule. A total of 200 contact farmers and 400 non-contact farmers were selected for the study. The 200 contact farmers were selected through systematic random sampling technique from the list of contact farmers obtained from the ADP zone. The selection was made from 100 randomly selected sub-cells with two contact farmers from each sub-cell. For ease of administration of the interview and to ensure that the contact farmers being described in the study are the ones assessed by non-contact farmers, all the 400 non-contact farmers were selected from the same sub-cells the contact farmers were drawn for the study. The sample size spread across five of the seven Local Government areas in the zone.

The structured interview schedule contained items concerning personal characteristics of the farmers including age, sex, education, farming experience, major farm enterprise, major crops grown, farm size, household size, membership in farmers organizations/associations, leadership status, farm income, extension contact, items to measure use and knowledge of agricultural innovations, and items to measure non-contact farmers perception of effectiveness of contact farmers' work.

For farmers who are illiterates and do not keep farm records, farm income was estimated from the gross farm output or the quantity of major crops in local measures (maize, sorghum, cowpea, groundnut and cotton) reportedly harvested during the previous season and this was converted to naira. For this same category of farmers, farm size was estimated from the total number of non-contiguous farm plots cultivated and the number of ridges in each plot. This measure of farm size is justified from previous studies in this area (Norman, 1974; Ega, 1980) which indicated that there was a significant correlation between the number of plots and the size of holding expressed in acres. Farmer characteristics were analysed using descriptive statistics. T-tests were used to determine whether the differences in some of the characteristics among contact and non-contact farmers were significant.

Use/knowledge of innovations was measured by listing 15 innovative practices pertaining to four major crops (maize, sorghum, cowpea and groundnuts), taught at the fortnightly training seasons (FNTs) of EAs in the previous farming season which had been extended to farmers by EAs during their fixed fortnightly farm visits. Farmers were asked to indicate which of the innovative practices they applied on their farm. This same 15 practices constitute the knowledge test of the farmers. The reliability of the test was measured with the response of 30 farmers by using the split-half technique. The result of the reliability test was r = 0.57 (P 0.01) indicating reasonably high reliability. Each of the 15 practices indicated was assigned equal weighting. Use/knowledge of innovation score for each farmer was computed by summing up the number of innovations indicated and the scores on the knowledge test. A linear regression analysis was carried out with use/knowledge of innovations score as dependent variable and farmer characteristics as independent variable.

Perceived effectiveness of contact farmers work was determined by asking non-contact farmers to rate contact farmers on 13 items pertaining to their work. The responses were summarized using frequency counts, percentages, and means.

STUDY FINDINGS

Characteristics of Contact and non-Contact Farmers

The data in table 1 show that the majority (71·5%) of contact farmers were below the age of 40 years, while 45·8% of non-contact farmers are within that age category. Ninety nine percent of contact farmers were male while a similarly large (93%) proportion of non-contact farmers are male. About 7% of contact farmers cultivated less than 1 hectare while 35% of non-contact farmers fall into this category. The mean farm size cultivated by contact farmers was 4.2ha while that of non-contact farmers was 3.9ha. The T-test value shows that there is no significant difference in the mean size of farms among contact and non-contact farmers.

The majority of both contact and non-contact farmers are illiterates. An almost equal proportion of both groups of farmers 61·5% for contact farmers, and 64.5% for non-contact farmers, are members of farmers associations. The data indicate that contact farmers had higher mean farm income than non-contact farmers. The T-test result shows that the difference in the mean farm income among the two groups of farmers is significant at .01 level.

An almost equal proportion of both contact (19.5%) and non-contact (20.5%) farmers had one form of leadership status or the other; as ward heads, village heads, chairman of local farmers association and co-operative groups. The major farm enterprise of the majority of both contact and non-contact farmers is crop production. Only 6.5% of contact farmers and 12% of non-contact farmers have livestock as their major enterprise. The only fish farmer in the sample is a contact farmer. The small proportion of contact and non-contact farmers who are livestock producers can be explained from the point of view that livestock herding in the northern part of Nigeria is mostly done by Pastoral Fulanis, who in most cases are not sedentary or settled farmers, and only sedentary farmers were sampled for the study. Although, extension agents are to visit contact and non-contact farmers regularly, twice in a month, 30% of non-contact farmers did not receive any visit from EAs in the last one year while 5% of contact farmers did not receive visits. About 71.5% of contact farmers and 68.2% of non-contact farmers received at least one visit in a month. The mean monthly visits to contact and non-contact farmers by EAs is 1.8 and 1.2 respectively. It is obvious that even contact farmers do not receive the mandatory twice a month visit from EAs.

About 51.5% of the contact farmers scored more than 50% while 22.5% of non-contact farmers had similar scores on use/knowledge of innovations. The mean score for contact and non-contact farmers were 10.5 and 6.7 respectively. the T-test result shows a significant difference in the mean scores among the two groups of farmers.

Factors Influencing Use/Knowledge of Innovations

The data in Table 2 indicate that age, farm size, farming experience farm income and extension contact are significant explanatory variables. The regression co-efficient of age, and farming experience were negatively related to use/knowledge of innovations. This shows that younger farmers and farmers with fewer years of experience had higher use/knowledge of innovation scores. Farm size, farm income and extension contact are positively related to use/knowledge of innovation. These findings are consistent with most findings in adoption/diffusion literature in Nigeria. Variables such as sex, education, being a contact farmer, membership in associations and leadership status were not significant in explaining the variations in the use/knowledge of innovations among the farmers. However, it should be noted that all the variables together explain only about 36% (see R^2) of the variability in the use/knowledge of innovations among the farmers. This means that other variables not included may be important in explaining use/knowledge of innovations.

Perception of Effectiveness of Contact Farmers by non-Contact Farmers

Data in Table 3 reveal that the majority of non-contact farmers rated the performance of contact farmers in various aspects of their work as either good or fair. Only item 6, i.e. explaining improved practices on SPAT was rated as poor by over 50% of non-contact farmers. This may be due to the fact that the idea of SPAT was introduced in less than a year before the study commenced. Both contact and non-contact farmers may not have thoroughly understood the practical application of SPAT in disseminating innovations at the time the study was conducted. The mean rating of all the 13 statements ranged from 1.6 to 2.5 indicating a widely divergent perception of effectiveness of some aspects of the work of contact farmers.

CONCLUSION AND EDUCATIONAL IMPORTANCE

This study shows that contact farmers at the Maigana zone of Kaduna State ADP in Nigeria represent a broad spectrum of different categories of farmers, though disproportionately skewed in favor of male crop producers. The study also show that most non-contact farmers generally rated the performance of the contact farmrs in disseminating agricultural innovations as either good or fair. The study supports the notion that if the criteria for selecting contact farmers in the T&V system is strictly adhered to, the use of contact farmers can be profoundly rewarding both to the extension service and farmers.

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Table 1: Characteristics of contact and non-contact farmers

Characteristics	Contact Farmers			Non-contact farmers		
	No	%	Mean	No	%	Mean
Age(Years)						
20-29	75	37.5		48	12.0	
30-39	68	34.0		135	33.5	
40-49	32	16.0	34.5	97	24.2	41.3
50 & above	25	12.5		120	30.0	
Sex:						
Male	198	99.0	-	372	93.0	-
Female	2	1.0		28	7.0	
Farm Size (ha):						
Less than 1	15	7.5		140	35.0	
1-3	83	41.5		88	22.0	
4-6	72	36.0	4.2	162	40.5	3.9
7 and above	30	15.0		10	2.5	(t=192) NS
Education:						
No formal schooling	137	68.5		310	77.5	
Adult education	21	1.0		40	10.0	
Primary	28	14.0	-	40	10.0	-
Secondary	33	16.5		10	2.5	
Farming experience (yrs)						
1-5	72	36		45	11.3	
6-10	79	39.5		72	18.0	
11-15	08	14.0	7.2	90	22.5	10
16 and above	21	10.1		193	48.2	
Membership in Farm Assoc.						
Yes	123	61.5		258	64.5	
No	77	38.5		142	35.5	
† *Farm Income*						
Low-Below N10,000	108	54.0		283	70.8	9,300
Medium N10,000-N15,000	69	34.5		105	26.2	(t=3.17)**
High N16,000 & above	23	11.5	12,500	12	3.0	
Leadership status						
Yes	39	19.5	-	82	20.5	-
No	161	80.5		318	79.5	
Major Farm Enterprise						
Crops	186	93.0	-	392	88.00	
Livestock	13	6.5		48	12.00	-
Fisheries	1	0.5		0	0.0	
Use/Knowledge Innovation score						
Less than 5	28	14.0		221	55.3	6.7
5-7	69	34.5		289	22.2	(t=2.23)**
8-10	89	44.5	10.5	53	13.3	
11 and above	14	7.0		37	9.2	

t = significant at .05 level
** = significant at .01 level
NS = not significant
†Between 1991 and 1992 the average exchange rate for the Naira was N15 = $1

x Maximum possible score is 15

Table 2:

Linear Regression: Estimate of Factors Influencing Use/Knowledge of Agricultural Innovations

Independent Variables	Regression Co-efficient	T-value	Standard Error
Age (yrs)	-0.112	-3.613**	0.031
Sex	0.347	1.012NS	0.343
Farm size (ha)	0.395	3.160**	0.125
Education (yrs)	0.283	4.998NS	0.057
Farming Experience (yrs)	-0.097	-2.086*	0.037
Being a contact farmer(dummy 0-1)	0.081	0.561NS	0.144
Membership in Farmers Assoc.	0.003	0.291NS	0.011
Leadership Status	0.011	0.375NS	0.027
Farm Income (N)	1.692	7.421**	0.228
+Extension contact (No. of EA visit/month)	0.317	0.613**	0.088
Intercept	0.732		
R^2	0.361		
Adjusted R^2	0.293		

* T - Values significant at .05 level

** T-values significant at .01 level

+ Actual; number of visits received by farmer from the EA as individual or group of farmers

NS = not significant

Table 3

Perception of Effectiveness of contact farmers by non-contact farmers.

Statements	Good		Fair		Poor		Mean
	No	%	No	%	No	%	
1 Visiting other farmers' field regularly	180	45.0	160	40.0	60	15.0	2.3
2 Allowing other farmers to visit his/her farm to observe application of recommended practices	250	62.5	140	35.0	10	2.5	2.5
3 Methods of conducting farmer group meetings	196	49.0	180	45.0	24	6.0	2.3
4 Conducting demonstration to other farmers on improved practices.	82	20.5	150	37.5	168	42.0	1.8
5 Explaining procedures for carrying out improved practices	199	49.8	150	37.5	51	12.7	2.3
6 Explaining improved practices, demonstrated on *SPAT	75	18.8	120	30	205	51.2	1.6
7 Caring for SPAT	62	15.5	175	43.7	163	40.8	1.7
8 Giving fair treatment to all farmers	120	30.0	145	36.2	135	33.8	1.9
9 Being careful and avoiding mistakes in explaining improved practices	215	53.7	108	27.0	77	19.3	2.3
10 Knowledge of farming problems	218	54.5	111	27.8	71	17.7	2.4
11 Correcting mistakes when improved practices are applied wrongly	73	18.2	182	45.5	145	36.3	1.8
12 Timeliness of calling group meetings to discuss production recommendations	150	37.5	192	48.0	58	14.5	2.1
13 General performance of the contact farmer in disseminating innovations	187	46.8	158	39.5	55	13.7	2.3

*SPAT (small plot adoption technique) is a small demonstration plot, usually 10m x 10m. It is aimed at teaching the farmer improved practices and enable him to compare results of old and new practices.

*The scale for responses was: Good = 3; Fair = 2; Poor = 1.

VILLAGE EXTENSION WORKERS (VEWs) AGRICULTURAL EXTENSION OFFICERS, AND CONTACT FARMERS PERCEPTIONS OF VEW VISITS UNDER THE TRAINING AND VISIT (T & V) SYSTEM

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VILLAGE EXTENSION WORKERS (VEWs), AGRICULTURAL EXTENSION OFFICERS, AND CONTACT FARMERS PERCEPTIONS OF VEW VISITS UNDER THE TRAINING AND VISIT (T & V) SYSTEM

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INTRODUCTION

The Training and Visit (T&V) system of extension was first introduced in India in 1978. According to Benor, Harrison, and Baxter (1984), the T&V system is designed to change attitudes and opinions of farmers, increase their knowledge and understanding, and result in adoption of improved practices that increase production. Under the T&V system, schedules of work, duties and responsibilities of extension personnel are clearly specified and closely supervised at all levels. The characteristic features of the system are: 1) professionalism, 2) single line of command, 3) time-bound work, 4) regular and continuous training, and 5) close linkage with research (Benor, et al., 1984).

Under the T & V system, the transfer of know-how (research findings) evolved by agricultural scientists is achieved through "training" and "visits." Training provides for the transfer of technology from researchers and scientists to VEWs. The "visits" provides for the transfer of know-how from VEWs to contact farmers through a scheduled program of visits to a fixed number of contact farmers. In turn, these contact farmers are supposed to disseminate the information to fellow farmers.

The role of VEWs, agricultural extension officers (AEO) and contact farmers deserve special mention in the context of this study. The village level extension worker (VEW) is a critical link in the transfer of technology from research stations to the farmer's field. The VEW's role is to educate, train, and persuade farmers to adopt new ideas and use improved practices. In addition, the regular visits by VEWs to the farmer's field is a must, because T&V emphasizes regular training of staff and programmed visits to farmers. During these visits, the VEWs have to put forth greater efforts in identifying the farmer's problem(s), identifying appropriate technical solutions, and recommending practices that help farmers to improve production. A competent VEW should possess adequate knowledge of agriculture subject matter and also possess a knowledge of principles, methods and techniques of extension education.

The AEO has two basic functions: 1) to review and assist in the organizational aspects of the job of the VEW which may include scheduling and timing of visits, organization of meetings, maintaining diaries, etc.; 2) to provide technical support to the VEW, especially to see that production recommendations are effectively taught to farmers and assist the VEW in situations where the VEW is not in a position to address the problem(s). In general, the major role of the AEOs is to help VEWs to increase their effectiveness (Benor, et al., 1984).

Since frequent contact between VEW and all farmers in a village is not possible, VEW selects a group of farmers called "contact farmers." These contact farmers are selected by VEW and AEO, in consultation with local village leaders and elders. According to Benor et al. (1984), the contact farmer should possess the following characteristics: 1) represent the socio-economic and farming conditions; 2) regarded by other farmers as able and worthy of imitation; 3) practicing farmers; 4) willing to adopt relevant recommendations on part of their lands; 5) represent different types of families.

A number of researchers have examined various aspects of the T&V system. Some have investigated the effectiveness of visits by VEWs under the T&V system. Nataraju, Perumal and Nagaraja (1991) found that majority of the extension workers expressed satisfaction over the extension worker's visits relative to regular visits (72%), transfer of message to farmers (55%), bringing field problems to fortnightly training sessions (70%), conduct of program (83%), regular review of work (80%), advance publication of day, time, place and purpose of VEW visits (69%).

In a study of VEWs in North India, Singh and Israel (1989) reported that 60% of contact farmers and 72% of non-contact farmers perceived that the visits of VEWs to farmers' field was not as per schedule, resulting in failure to provide timely and adequate help and guidance to farmers. They suggested, to be effective, VEWs should comply with their scheduled visits.

Samarasinghe, Lawrence, Gartin and Odell (1990) evaluated the effectiveness of VEW visits in Sri Lanka. Findings indicated that VEWs were very positive regarding the effectiveness in developing group action among farmers. Similarly in regard to effectiveness of visits, VEWs strongly agreed that their visits were effective and they carried a relevant technical message on each visit. Findings also indicated that age, education level and work experience of VEWs were significantly associated with effectiveness of VEW visits. Older VEWs (over 40 years of age) were significantly greater in their agreement than younger VEWs relative to promoting group action. VEWs with higher education levels (more than a diploma) perceived that it was easier for them to identify field problems than VEWs with baccalaureate degrees. VEWs with more work experience (more than 5 years) agreed that they have greater confidence in developing and preparing teaching aids, and possess more knowledge in technical subject matter than did those with less work experience.

The success or failure of the T&V system, to a large extent, depends on how effective the VEWs are in educating farmers to adopt improved agricultural practices. Thus, this study was designed to determine the effectiveness of the VEW's visits under the T&V system as perceived by VEWs themselves, their immediate supervisor, the AEOs and contact farmers who receive the information.

PURPOSE

The primary purpose of this study was to examine the effectiveness of VEW visits as perceived by VEWs themselves, AEOs and contact farmers relative to: 1) promoting group action; 2) effectiveness of VEW visits and; 3) message conveyance and adoption under the T&V system. In addition, whether or not the type of land (irrigated or dry) farmed by clients was a factor in perceived effectiveness of VEW visits was also examined.

METHODOLOGY

The subjects for the study consisted of a random sample of 68 VEWs, 15 AEOs, and 61 contact farmers in Mandya district of Karnataka, a state in south India. The instrument developed by Samarasinghe, et al. (1990) was modified and used to collect data for the study. Face and content validity was established using three extension education faculty members at The Pennsylvania State University. The instrument contained two sections: 1) effectiveness of VEWs in promoting group action, visits to farmer's fields and message conveyance and adoption, measured on a Likert-type scale that ranged from 1"strongly disagree" to 5 "strongly agree," and 2) demographic information.

Data were collected through personal interview method. Data provided by these 68 VEWs, 15 AEOs and 61 contact farmers were usable. Data were analyzed using means, percentages, and ANOVA. A post -hoc reliability analysis indicated that the instrument is reliable (Cronbach's alphas were .84 for promoting group action; .95 for message conveyance and adoption and .86 for effectiveness of VEW visits.

RESULTS AND CONCLUSIONS

One way analysis of variance (ANOVA) and Scheffe procedures were used to examine differences in effectiveness of VEW visits as perceived by VEWs, AEOs and contact farmers. Results are presented in Tables 1 and 2. Significant differences were found between the three group's perceived effectiveness of VEW visits. Results of the Scheffe test revealed that VEWs were significantly different from AEOs and contact farmers relative to promoting group action, making VEW visits and message conveyance and adoption. In all the three areas, VEWs perceptions were significantly higher than AEOs and contact farmers. Overall, no significant differences were found between AEOs and contact farmers' perceptions. However, AEOs' ratings of VEWs promoting group action was lower than contact farmer ratings. It is interesting to note that AEOs' ratings relative to farmers sharing information from VEW among their group and farmers successfully conducting group activities were much lower than VEWs and contact farmers (Table 1).

A two-way analysis of variance was performed to determine whether or not the type of land (irrigated/dry land) made a difference in the three groups perceived effectiveness of VEW visits relative to promoting group action, making VEW visits and message conveyance and adoption. The results of the tow-way ANOVA are shown in Table 4. Examination of Figure 1 revealed that significant interaction existed among the variables group (VEW/CF/AEO) and land type (irrigated/dry land). VEWs perceived that they were effective in promoting group action, in making visits to farmer's field and message conveyance and adoption regardless of whether they worked in irrigated or dry land areas. Similarly AEOs were in agreement with VEWs (Table 3). However, contact farmers perceived that VEWs working in irrigated areas were significantly more effective in all the three areas (promoting group action, making visits to farmer's fields and message conveyance and adoption) than VEWs working in dry land areas. The differences in perception scores of contact farmers

Table 1. ANOVA Results for Promoting Group Action and Effectiveness of VEW Visits

Item	VEWs Mean[a]	Contact Farmers Mean[a]	AEOs Mean[a]	F Ratio	F Prob.
Promoting Group Action					
VEW encourages farmers to develop group action	4.31A	3.92B	4.06BA	5.58	0.005
VEW visits encourages exchange of ideas among farmers & VEW	4.46A	4.05B	3.86C	10.93	0.001
Farmers understand the role of VEW	3.95A	3.72A	3.43A	2.88	0.059
Group action makes it easier to change attitudes of farmers	4.12A	3.98A	4.00A	0.54	0.581
Farmers share information obtained from VEW among their group	3.37A	3.41A	2.93A	1.56	0.212
Farmers have a desire to help others within the group	3.31A	3.49A	2.64B	4.76	0.010
Farmers conduct group activities successfully	3.61A	3.08B	3.05B	5.12	0.007
Farmers participate in group activities successfully	3.67A	3.10B	3.14B	5.47	0.005
Farmers perform successfully in group activities	3.58A	3.20B	2.93A	3.85	0.023
Overall	**3.80A**	**3.53B**	**3.25B**	**7.38**	**0.009**
Effectiveness of VEW Visits					
Visits to farmer groups help VEW to identify farmers' needs	4.46A	3.92B	4.23B	12.73	0.001
Visits help the VEW identify field problems	4.42A	4.00B	4.33B	10.59	0.001
Visits help the VEW identify field requirements	4.18A	3.97B	4.27CA	5.82	0.004
VEW makes visits according to the fixed schedules	4.51A	3.03B	3.50C	43.20	0.001
VEW recognizes farmers' towards resistance to change	4.19A	3.29B	3.73B	19.77	0.001
VEW provides effective solutions(s) to farmers' technical problems	4.48A	3.51B	4.20CA	25.32	0.001
VEW visits influence a change in farmers practices	4.38A	3.79B	3.93B	9.52	0.001
VEW visits influence a change in farmer attitudes	4.21A	3.84B	3.73B	5.15	0.007
VEW visits facilitate contacts with non-progressive farmers	4.29A	3.90B	4.00B	7.58	0.007
Farmers and VEW decide on key points to be stressed in the extn. programs	3.86A	3.21B	3.20BC	9.19	0.002
Mobility is a problem in making visits to farmers	4.14A	3.26B	3.67B	10.48	0.001
Overall	**4.27A**	**3.60B**	**3.89B**	**36.56**	**0.001**

[a] Mean could range from 1 (strongly disagree) to 5 (strongly agree).
Means followed by the same alphabet are not significantly different from each other.

Table 2. ANOVA Results for Message Conveyance and Adoption

Item	VEWs Mean[a]	Contact Farmer Mean[a]	AEOs Mean[a]	F Ratio	F Prob.
Message Conveyance and Adoption					
Technical information provided by the VEW is timely	4.47A	3.42B	3.87BC	29.02	0.001
Technical information provided by the VEW is effective	4.29A	3.57B	4.00B	12.40	0.001
Technical information provided by the VEW is adequate	4.04A	3.34B	3.87B	8.33	0.004
VEW has improved the technical knowledge of the farmer	4.38A	3.74B	3.80BC	11.77	0.001
VEW uses a variety of teaching methods to educate farmers	4.19A	2.98B	3.40BC	24.09	0.001
Adoption of innovations has helped farmers increase production	4.45A	3.79B	4.13B	11.83	0.001
VEW generally carries a relevant technical message	4.48A	3.67B	3.86BC	15.36	0.001
VEW disseminates latest research information to farmers	4.46A	3.62B	4.00B	18.09	0.001
VEW provides information throughout the production cycle	4.39A	3.29B	3.80B	24.33	0.001
VEW reviews adoption of previous recommendations during visits	4.19A	3.47B	3.71B	9.63	0.001
VEW devotes sufficient time to educate farmers during visits	4.32A	3.27B	3.28BC	22.41	0.001
VEW is competent in preparation of teaching aids	4.16A	2.88B	3.43BC	32.40	0.001
VEW is technically competent	4.47A	3.52B	4.00B	22.74	0.001
VEW has helped farmers to change their practices	4.33A	3.60B	3.86B	14.07	0.001
VEW is provided with facilities to prepare teaching aids	3.01A	2.49B	3.28B	4.63	0.011
Overall	**4.22A**	**3.32B**	**3.64B**	**30.81**	**0.001**

[a] Mean could range from 1 (strongly disagree) to 5 (strongly agree). Means followed by the same alphabet are not significantly different from each other.

Table 3. Means and Standard Deviations for Promoting Group Action, Effectiveness of VEW Visits and Message Conveyance and Adoption by Group and Land Type Farmer Client

	Irrigated			Dryland			Total		
Group	n	M	SD	n	M	SD	n	M	SD
Promoting Group Action									
VEW	31	3.77	.50	37	3.83	.62	68	3.80	.57
CF	33	3.75	.39	28	3.28	.63	61	3.51	.56
AEO	8	3.31	.36	7	3.19	.74	15	3.25	.55
Total	72			72			144		
Effectiveness of VEW Visits									
VEW	31	4.30	.34	37	4.25	.36	68	4.28	.35
CF	33	3.79	.38	28	3.38	.61	61	3.61	.54
AEO	8	3.86	.42	7	3.90	.40	15	3.88	.39
Total	72			72			144		
Message Conveyance & Adoption									
VEW	31	4.23	.40	37	4.22	.44	68	4.22	.42
CF	33	3.69	.35	28	2.89	1.05	61	3.32	.85
AEO	8	3.62	.57	7	3.67	.68	15	3.64	.60
Total	72			72			144		

Table 4. Two-Way ANOVA of Promoting Group Action, Effectiveness of VEW Visits and Message Conveyance and Adoption by Group and Land Type Farmer Client

Source	df	ss	ms	F	P
Promoting Group Action					
Group	1	1.127	1.127	3.483	.064
Land type	1	1.053	1.053	3.253	.073
Group by land type	1	2.326	2.326	7.187	**.008**
Error	140	45.304			
Total	143	49.666			
Effectiveness of VEW Visits					
Group	1	13.096	13.096	66.915	.001
Land type	1	1.228	1.228	6.275	.001
Group by land type	1	1.330	1.330	6.795	**.010**
Error	140	27.400			
Total	143	42.559			
Message Conveyance and Adoption					
Group	1	23.354	23.354	59.566	.001
Land type	1	3.661	3.661	9.339	.003
Group by land type	1	6.006	6.006	15.318	**.001**
Error	140	54.889			
Total	143	86.738			

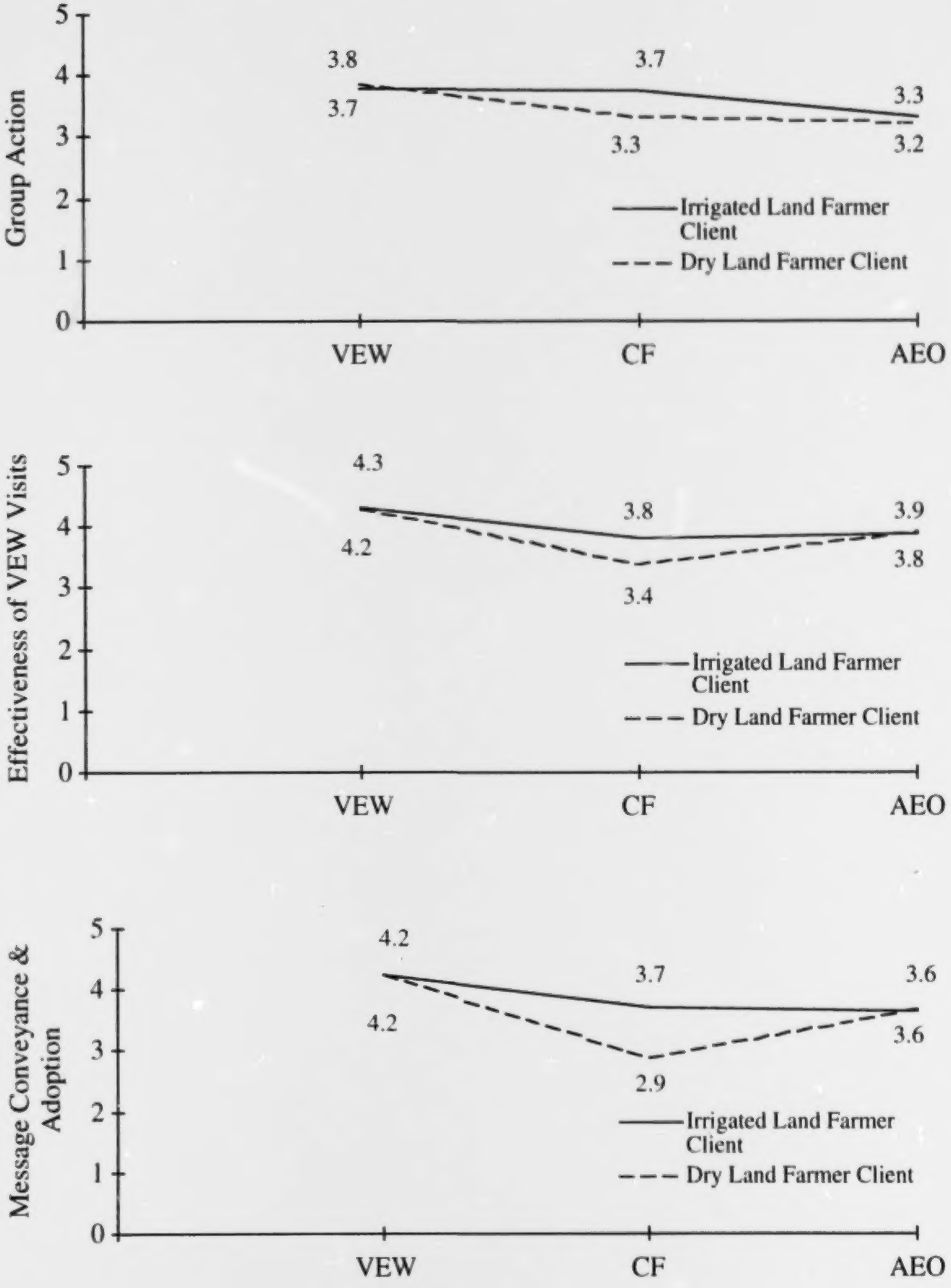

Figure 1: Interaction of promoting group action, effectiveness of VEW visits, and message conveyance and adoption for group and land type.

were more pronounced for message conveyance and adoption, followed by promoting group action and making visits to farmer fields. Three possible reasons could explain this perception. Traditionally, extension workers have targeted resource rich farmers in irrigated areas for publicizing their extension programs and give more emphasis to farmers in irrigated areas. Lack of adequate transportation facilities to efficiently reach farmers in time and the relationship that extension workers have with others in the area may have lent support to this perception.

EDUCATIONAL IMPORTANCE

Overall, it appears that both VEWs, AEOs and contact farmers have positive perceptions about VEW's effectiveness in: 1) promoting group action, 2) visiting farmer's fields; and 3) conveying messages that help adoption of improved practices. However, three areas needs attention.

First, a need exists for training VEWs and farmers in the area of promoting group action. For VEWs, such training should focus on motivating farmers to successfully participate and perform in group activities. For farmers, such training should focus on providing hands on experiences to conduct and participate in group activities that enhance the decision making behavior of farmers.

Second, in dry land areas, timely visits and conveyance of messages are crucial because farmers, to a greater extent, depend on rains for their agricultural operations unlike farmers in irrigated areas. Because of this reason (often called gambling in monsoon), VEWs have to make their visits as scheduled and prepare appropriate recommendation plans. If VEWs are not in a position to make visits in time, then the very purpose of giving advice to farmers may prove fruitless. Therefore, VEWs in the dry land areas should consider to a greater extent the weather reports in advance and plan their visits to the field. Such forecasting and planning will help VEWs to provide more timely advice and recommendations to farmers.

Third, VEWs in dry land areas should be provided with adequate facilities in terms of transportation, and teaching materials to visit farmers in time and advise them on the recommendations. Their timing of visits is especially crucial if the visit is to achieve maximum educational benefits.

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EXPERT IDENTIFICATION OF IN-SERVICE TRAINING NEEDS OF FIELD AGENTS WORKING IN TRAINING AND VISIT (T&V) SYSTEMS OF EXTENSION

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INTRODUCTION

Farmers living in developing countries comprise a majority of the one billion farmers in the world (UNDP Report, 1991). Most are faced with poverty and illiteracy and lack access to agricultural credit, farm inputs, and efficient extension services. Many are slower their commercial counterparts in adopting new technologies, competing for scarce resources, and contributing to broad based agriculture. Such problems can only be addressed by providing access to technologies and resources through efficient extension services.

Extension education services have not reached all farmers in developing countries due to the numerous problems faced by the farmers as well as the extension agencies. The challenge lies not only in reaching small scale farmers with new technologies, but also in convincing them of their advantages over traditional methods. Extension will benefit these farmers only if organized and staffed by competent, well-trained personnel. According to a United Nations Development Programs report (1991), 40 percent of all extension agents in developing countries (approximately 225,000 field agents) have inadequate technical and educational training. Consequently, the potential for extension to play an important role in technology transfer is extremely limited. Improving the quality of extension personnel should be a high priority for all national extension systems, and especially those in developing countries.

One way to effectively improve and support extension personnel is through in-service training. In-service training emphasizes knowledge, technical, and professional skills that may be imparted to extension workers, thus increasing on-the-job effectiveness. In-service training is a major component of the Training and Visit (T&V) system of extension. Attention is given to improving specific agents' skills, which will make them more effective and efficient. However, little progress has been made in providing for effective in-service training of extension field personnel who are in direct contact with farmers (Galgali & Lindt, 1983; Rogers, 1969).

The primary aim in training field personnel is to impart information and skills for prompt passage to farmers, particularly on how to overcome constraints which limit increased production, how to reduce risks, and how to increase profits (Galgali & Lindt, 1983). This suggests the need for extensionists to be more effective in (1) relevant technologies needed by farmers, (2) diagnostic skills, and (3) appropriate communication techniques. For in-service training to be effective, the above three factors should be addressed properly.

In-service training requires not only skills development but also the trainers' understanding of the training process and role and value of adequate planning of such training. Trainers must be sensitized to all aspects of in-service training, and especially in the areas of needs assessment, designing appropriate training content, content presentation, teaching methodologies, and learning material development.

PURPOSE

The purpose of this study was to utilize expert opinion to identify in-service training needs of field agents working in T&V systems of extension in developing countries. Specific objectives of the study were to examine in-service training in T&V systems as related to: (1) training content and the teaching of communication skills; (2) trainers' availability, qualifications, and teaching methods utilized; (3) the availability of facilities and in-service training materials; (4) participants' value of in-service training sessions; (5) the overall relevancy of in-service training programs; (6) agents' transportation needs in order to participate in in-service training sessions; (7) the most and least productive aspects of in-service training sessions; and (8) the experts' recommendations on in-service training needs.

METHODOLOGY

The study utilized a qualitative methodology which allowed the researchers to capture the underlying in-service training needs of field agents working in T&V extension systems in developing countries. The design also permitted the researcher to record and understand the study participants in their own terms and in sufficient depth. Patton (1990) argued that qualitative methods enable researchers to emphasize the human element of inquiry, and study interdependence of parts and their interaction in complex systems. Data collected from qualitative studies usually consist of detailed descriptions of situations, events, interactions and observed behaviors.

Population and Sample Size

The purposeful sample included 25 experts in international extension. The initial source of experts' names was the Association of International Agricultural and Extension

Education Directory, 1992 Edition. The criteria for selecting the final panel of experts were that an expert: 1) was knowledgeable in international extension education and/or agricultural development; 2) had work and/or consultation experience in international agricultural systems, preferably under T&V extension systems; 3) (preferably) had worked for some time in a developing country using the T&V system; and 4) presently worked and/or consulted within the United States.

Since there are no guidelines regarding sample size in qualitative studies (Patton, 1990), problems of sampling, selection, and frames do not exist in a qualitative design. The small, purposeful sample chosen for this study supports sufficiently the purpose of the study since there is no objective of generalizing to a larger population of experts.

Instrumentation and Data Collection

The researchers developed a nine-item interview schedule designed to investigate in-service training needs in the following focus areas:

(1) The teaching of communication skills to extension agents in T&V in-service training programs;
(2) The availability of in-service trainers, their average qualifications, and the teaching methods they utilize;
(3) The availability of teaching materials and facilities for in-service training of extension agents in T&V systems;
(4) The value of training sessions in supporting agents' job requirements;
(5) In-service training program content and its relevance to individual extension agents;
(6) The availability of transportation to and from in-service training;
(7) The most and the least productive elements of in-service training programs; and
(8) specific recommendations for improving in-service training as suggested by the international extension experts.

The interview schedule was pilot tested with extension professionals from developing countries utilizing T&V system who were currently in graduate school. The purpose of the pilot testing was to: (1) determine clarity of question wording; (2) ascertain relevancy of questions; (3) establish face and content validity; and (4) estimate the average time required for completing an interview. Modifications were made accordingly following the pilot testing.

A letter of introduction explaining the study was mailed to 25 experts on February 12, 1993. The letter asked the experts to identify preferred telephone interview dates and times; a list of issues to be discussed during the interview was attached. Approximately ten days after the letter was mailed, the researchers telephoned each expert to confirm the final telephone interview date and time. Interviews were conducted during the period beginning March 1 and ending April 1, 1993. With permission from the respondents, all interviews were tape-recorded so as to allow the researchers to concentrate on responses and appropriately organize follow-up questions.

Data Analysis

The study utilized inductive data analysis procedures. According to Lincoln and Guba (1985), inductive analysis aims at uncovering embedded information and making the information more explicit. Information from the respondents was transcribed and summarized on note cards using the constant comparative method of qualitative analysis (Glaser & Strauss, 1967). This method involves four steps: (1) coding the data into as many categories as necessary; (2) integrating categories where possible; (3) delimiting theory or main themes; and (4) examining the resulting coded series comprising the main themes.

To permit precise description of relevant content, raw data was organized into aggregated units (Glaser & Strauss, 1967), a categorization technique involving sorting coded units into provisional categories. Glaser and Strauss further suggest that this analysis be presented in a narrative form, (e.g., using examples from the data to clarify concepts and to demonstrate relationships between analysis and present conditions in the field).

RESULTS AND CONCLUSIONS

Findings are based on responses from twenty experts. Four main themes emerged from the analysis of data: (1) the process and content of in-service training; (2) resources required for in-service training; (3) the value of in-service training to participants; and (4) recommendations for improving in-service training sessions.

Ninety five percent of the experts interviewed indicated that in-service training in T&V system was deficient in teaching process and delivery skills. Experts observed that the technical component of the T&V training sessions received a lot more attention than the teaching of communication skills, sociology, psychology, and demonstration of tasks. Of all extension field agents, village level agents were reported to receive process and delivery skills.

The reported availability of extension trainers varied from country to country depending on the economic conditions of a country. Most countries in sub-Saharan Africa and Asia were reported to be facing problems in this aspect. India and three southern African countries were reported as having sufficient extension trainers. In most countries, trainers did not adequately utilize effective adult education teaching methods. Responding experts described a typical training session as a series of lectures on technical agriculture. In India and most Asian countries, the average qualifications of extension trainers was estimated to be between a Bachelor of Science and a Master of Science degree; in Africa, a two or three year diploma or certificate was average.

The reported availability of training materials, equipment, and facilities varied depending on economic conditions. Experts felt that although additional teaching resources would certainly help, trainers could still do a good job of teaching by being more creative in their teaching methods and utilizing existing resources.

Many experts were not satisfied with T&V's ability in meeting the training needs of extension agents. More than half of the experts reported that training sessions are conducted in a timely manner according to farming activities. Extension agents' involvement in conducting and planning sessions was reported to be minimal at best.

Attendance by extension agents at training sessions was reported to be very good for almost all countries. T&V training sessions focused more on field crops as compared to livestock, home-economics, and youth management. In most cases, topics emphasized techniques related to farm practices. Most experts reported a negative bias towards home-economics subject matter. Transportation was reported as a critical problem in the field which requires immediate attention. Lack of good roads and vehicles were mentioned as causes.

Experts identified role playing, direct agent' participation, and demonstration as the most effective methods of teaching during the in-service training sessions. Excessive lecturing and a lack of identifying farmers' needs were identified as the least productive aspects of the training sessions. Adult education teaching methods should be utilized, taught to agents, and used in the field at all times.

Based on the study findings, the following conclusions may be made regarding in-service training needs of field agents working in T&V systems in developing countries.

(1) T&V's in-service training program content is deficient in meeting extension field agents' needs, especially in the areas of communication skills development. Findings suggest that the technical component of T&V in-service training is fairly successful in transferring technical information to the agents. However, development of agents' process skills has not received adequate attention.

(2) Training sessions are well attended but their

effectiveness was seriously hindered by inappropriate instructional techniques. Most trainers are professionals with strong technical backgrounds but are inadequately trained to utilize adult education methodologies in their teaching.

(3) Lack of teaching resources can be a problem, but creative trainers can be successful without them. Although the availability of such materials depends on the immediate economic conditions, African countries south of the Sahara seemed to be most affected. Most countries in this region utilize out-dated and inadequate teaching materials. Affluent countries have better training resources and are doing much better in conveying skills to agents as compared to poorer countries. In most training sessions, there is a bias towards field crops as topics for discussions. Home-economics subject matter received minimal attention in many T&V in-service training programs. T&V in-service training usually concentrates on major farming enterprises of specific regions, consequently ignoring other important sectors of rural life (e.g., youth development and family-life planning).

(4) Transportation is the most crucial problem facing T&V systems, particularly in-service-training components. There are insufficient number of vehicles, and those available lack fuel, spare parts, and proper maintenance.

(5) Role playing and hands-on activities are the most effective teaching methods for in-service training. Lecturing as a sole pedagogical approach does not provide the most appropriate learning opportunity. Many trainers over-utilize lecture due to their unfamiliarity with other adult teaching approaches. The responding experts strongly emphasized the need to incorporate the teaching of process and delivery skills and the utilization of adult education teaching techniques, along with the technical subject matter, in the overall training scheme.

EDUCATIONAL IMPORTANCE

Based upon the findings and conclusion, the following implications are suggested.

(1) Developing countries whose economies depend on agriculture should assess in-service training needs of field agents and implement strategies of solving these problems. Such strategies should be integrated with the extension agents training in order to have effective trainees output. Training activities should be based on identified needs of the extension agents. Courses and training programs should be evaluated frequently for their relevancy and effectiveness. Greater emphasis

should be placed on learning through hands-on experiences. In-service training should be a continuous process and relevant to the problems faced by the agents during their field visits.

(2) Extension agents should be given time to participate and repeat what they have learned during in-service training. Small group discussions, role playing, and field trips should be better utilized. Additionally, short practical tests should be given to agents after each training session to assess the skills and knowledge gained.

(3) To encourage field agent participation in in-service training, extension administrators should provide reimbursement for transportation and/or boarding expenses. Efforts to decentralize in-service training programs so as to minimize agents' transportation and boarding expenses should be considered. If decentralization of training venues can be achieved, topics relevant to specific locations will be addressed adequately. Subsequently, training sessions will function more effectively, since they would focus on local farmers' problems and needs.

(4) For trainers to be able to teach well, they should be trained in adult education teaching methods. Extension departments should emphasize hiring trainers who have both technical knowledge as well as adult education expertise.

(5) Extension departments and agricultural universities should place higher priority on studies in the behavioral sciences. Basic courses in interpersonal communications and rural sociology should be emphasized. Additionally, in-service training sessions should place more emphasis on practical training for skills development.

(6) Extension departments should allocate funds for the purchase of modern training equipment. Personal computers, photocopying machines, and other desk-top publishing equipments would assist trainers in producing higher quality in-service teaching materials. Although the initial costs of such equipment is high, long term benefits are positive..

(7) Extension departments in developing countries should provide loans to field agents to purchase motor bikes, bicycles, and mopeds (motorized bikes) for field work. Alternatively, extension departments should increase agents' salaries and/or add special monthly cash allowances to salaries for agents to purchase their own transportation.

(8) Home-economics subject matter training should be given

greater priority by increasing the number of home-economics trainers, since most farmers are female and certain cultures forbid male agents to visit female farmers. There is need to have more female trainers as well as extension administrators and field staff so as to increase female farmers' access to appropriate agricultural technologies.

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Session J SECONDARY AND YOUTH PROGRAMS

1. **Creating a Stronger Model for International Youth Exchange: A Case Study**
   Arlen W. Etling

2. **Perceptions Held by Secondary School Agricultural Educators in Iowa Regarding Adding a Global Perspective to the Agriculture Curriculum**
   Rigoberto Perez-Morales
   W. Wade Miller

3. **Development of Vocational Agriculture in Swaziland: Perspectives of Swaziland Agricultural Professionals**
   Comfort B. Mndebele
   John R. Crunkilton

Creating a Stronger Model for International Youth Exchange:

A Case Study

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For the first time in history, a majority of the Latin American nations have democratically elected leaders. For the first time national educational planners in Africa, Asia, Latin America, and Eastern Europe can seriously focus on long-term educational goals including youth development through nonformal educational programs.

On too many occasions, during the last thirty years, the author has witnessed the failure of nonformal educational programs for youth and the demise of effective programs. Some of those failures have been due to political turmoil, national priorities which favored military spending, or economic recession. Programs that were started during the 1960's and seemed to be working have been terminated or absorbed into bureaucratic structures in a "watered down" form.

One effective international nonformal education program was the International Farm Youth Exchange (IFYE) which was started in 1948 under the direction of the National 4-H Council. This program placed young adults, ages 19 to 25, with host farm families to live and work together for six months while learning a language and culture and promoting world peace. Subsequently IFYE was changed to International 4-H youth exchange and expanded to include non-farm families. Due to the success and popularity of IFYE a group exchange called IFYE Ambassador was added. This was a short term exchange (4-5 weeks) for youth 14-19 years old. These youth traveled in groups of approximately 15 with an adult chaperone. They combined touring with a host family experience in the host country. In 1992 the National 4-H Council decided to terminate their administration of both IFYE programs. IFYE alumni were able to find a private group based in Phoenix, Arizona, to assume administration of the IFYE program and resume the IFYE Ambassador program after a year's absence.

Many types of work or study exchange programs have been initiated over the years. Some of these are very successful. Since they are usually individual exchanges, however, the effectiveness varies greatly from one participant to another and for the specific conditions in the country visited. For many individuals these experiences are positive and life-changing. For others they are little more than tourist experiences that lead to misconceptions and limited positive learning.

International group exchanges for youth can be powerful learning opportunities. Most international travel opportunities, however, have several problems. (1) They are so expensive that many families cannot afford to send their youth. (2) The educational quality is difficult to control. (3) They seldom address development issues at the local level. (4) They are often conducted by travel agencies whose commercial interests supersede educational considerations.

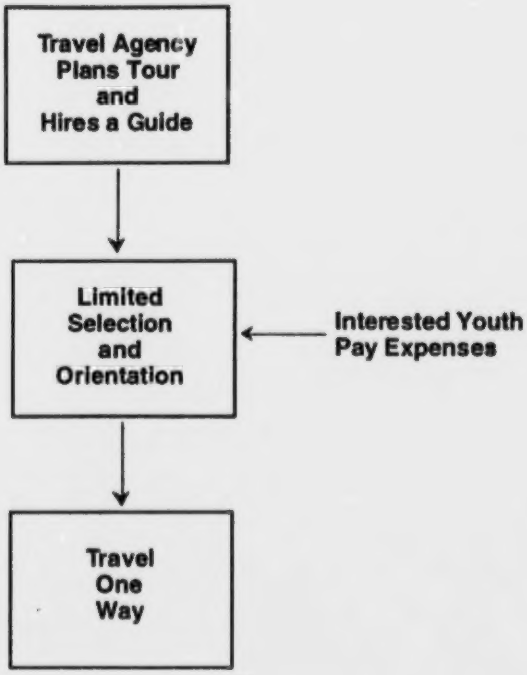
The Tour Group Model

An illustration of these problems can be found in the tour group model (figure 1). A travel agency plans the tour as a business venture. The agency hires a guide (i.e., a teacher of vocational agriculture) who is identified with the target client group (i.e., FFA youth). More emphasis is placed on publicity and recruitment than on selection and orientation. Typically selection is determined by the first 25 youth to pay the trip deposit which is set high enough to discourage withdrawal from the program. The guide might hold one orientation meeting which will mainly focus on documents and logistics. Travel is one-way. Participants stay in hotels (and only rarely with a host family for a few days). Sometimes the local young farmer organization helps arrange tour stops at members' farms. Evaluation is limited to a brief questionnaire on participant satisfaction at the end of the tour if any evaluation is conducted. Even at this low level of educational programming participants learn much from the nonformal learning experiences (planned, organized, and intentional but not a part of the participants school work) and even more from the informal learning experiences (unplanned observations, conversations, and interactions).

Little effort is made to conduct "debriefing" of participants at the end of their tour so that they may put their experiences in perspective.

A variation of the tour group model is the "work team." This concept is used particularly by church organizations to provide volunteer labor, usually church related, in another country. The work team can also be an effective learning experience and its effectiveness also varies greatly depending on the participants, the organization, the purpose of the trip, orientation, and many local conditions.

Figure 1. Tour Group MODEL

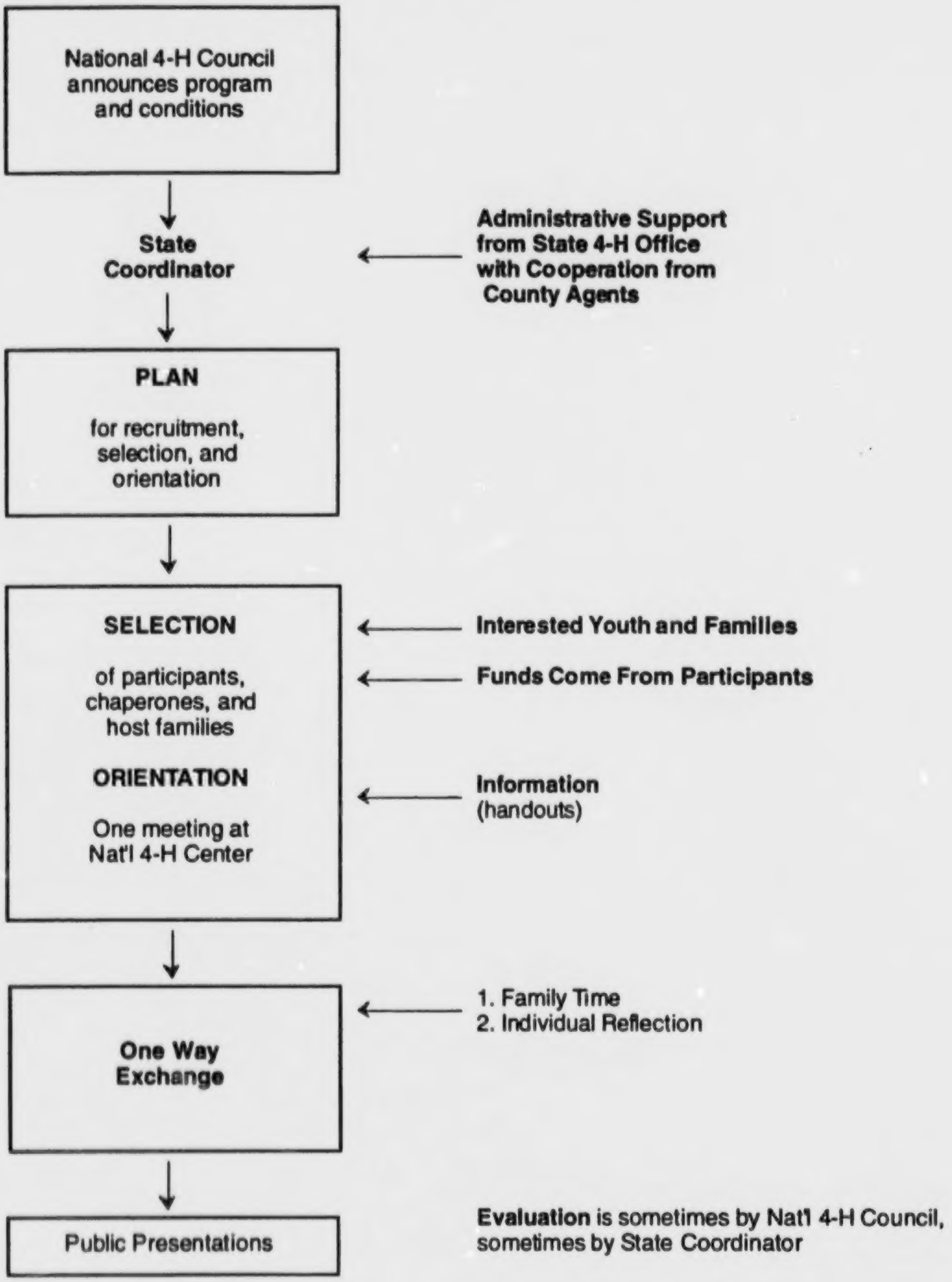

Travel Agency Plans Tour and Hires a Guide
Limited Selection and Orientation
Interested Youth Pay Expenses
Travel One Way

The 4-H Ambassador Model

The National 4-H Council improved the tour group model. Its model (figure 2) was developed over several years and involves collaboration between the national, state, and county levels in the United States as well as cooperation with organizations similar to 4-H in other countries.

The National 4-H Council negotiated with these organizations in other countries to determine destinations, costs, and subject matter focus for the outbound delegations. The range of destinations was then announced to state 4-H coordinators and county 4-H agents. In 1992 the destinations and foci included Spanish language study in Spain, equestrian experience in Brazil, environmental issues in Costa Rica, food preparation in France, natural resource study in Australia, literature and culture of England, and marketing local products in Italy. Costs ranged from $1,975 for Costa Rica to $3,995 for Australia. The programs in the European countries averaged about $3,100.

Figure 2. 4-H Ambassador MODEL


National 4-H Council announces program and conditions
State Coordinator
Administrative Support from State 4-H Office with Cooperation from County Agents
PLAN
for recruitment, selection, and orientation
SELECTION
of participants, chaperones, and host families
ORIENTATION
One meeting at Nat'l 4-H Center
Interested Youth and Families
Funds Come From Participants
Information (handouts)
One Way Exchange
1. Family Time
2. Individual Reflection
Public Presentations
Evaluation is sometimes by Nat'l 4-H Council, sometimes by State Coordinator

The state coordinators of international programs then screened applicants and sent their application files to the designated staff member at the National 4-H Council. When 15 applications (from any combination of states) were received for a particular destination, a chaperone would be selected (by National 4-H Council using a similar application form) and the delegation would be complete.

The state 4-H coordinator would provide some outbound orientation for the participants in that state and recruit host families for inbound delegations from other countries. Further orientation was provided just prior to departure for all delegations meeting at the National 4-H Center in Chevy Chase, Maryland. Orientation covered information on the country, information on 4-H in the U.S., role plays on cross-cultural effectiveness and communication, hints on packing and photography, and assistance with all of the documents needed to travel. A standard "code of conduct," defining acceptable behavior while traveling, was signed by each delegate. Each exchange lasted four or five weeks and included a combination of tours and host family experiences. Funding for delegates was the responsibility of the delegate's family. In many cases state or county 4-H funds or fund raisers were used to assist the delegates.

From the perspective of National 4-H Council, these exchanges were reciprocal. Once the Council sent a delegation to Spain, they were committed to host a delegation from Spain in a subsequent year. From the delegates' point of view, however, they were involved in a one-way exchange. Very rarely did a delegate to Spain subsequently host a delegate from Spain.

Delegates were encouraged to give public presentations on their 4-H ambassador trips. Some delegates, who received state scholarships to travel, were required to give a number of talks which served as a form of education for local 4-H members who were not able to travel abroad as well as publicity and recruitment for future exchanges. Preparing and presenting these talks also gave the traveler an opportunity to summarize and conceptualize the travel experience and its implications to his or her lifestyle. In this way the public presentations served as a debriefing step for the travelers.

Evaluation of the exchanges varied by year and by state. Most state coordinators evaluated participants' responses to their orientation program. In many cases a "trip report" was required by the state coordinator four weeks after returning to the U.S. National 4-H Council conducted evaluation of their orientation and asked chaperones for anecdotal information to indicate problems encountered on the exchange. A longitudinal study of the cost effectiveness was conducted by accountants at the National 4-H Council. In 1992 this exchange was terminated by National 4-H Council because of fiscal losses over the last several years. The educational value of these exchanges, however, was clearly superior to the tour group model. The 4-H ambassador model has had considerable impact since it was successfully employed by many states for several years.

A New Approach

In 1990 the W.K. Kellogg Foundation awarded almost $398,000 to the National 4-H Council to strengthen linkages between land grant universities and universities in Mexico in order to develop creative youth exchanges which would involve youth in community development. This grant enabled the National 4-H Council to develop a new model for youth exchange which would provide opportunities for youth who had not been able to afford exchanges under the 4-H ambassador model.

Purpose. The overall purpose of the exchanges was to develop an improved youth exchange model which would overcome the problems of models currently used by 4-H and FFA. The objectives of the project and each of the five partnerships were to: (1) strengthen linkages between the partner institutions, (2) further cross-cultural understanding and friendship between people in Mexico and the United States, (3) promote international development through study and the exchange of human and technical resources, and (4) build a model for a low-cost international exchange for youth that emphasized educational impact and contribution to community development.

Procedure. The National 4-H Council selected five partners each comprised of a U.S. land grant university and a Mexican university. Each of the partnerships (University of Arizona/ National University of Mexico, University of Minnesota/University of Oaxaca, Penn State University/University of Monterrey, Texas A & M University/University of Coahuila, and University of West Virginia/University of Guanajuato) implemented their projects in slightly different ways. In general, however, the same process was followed.

(1) In the first year of the grant they built the institutional linkages. They used a program planning process to define needs and priorities then proceed with a written plan. This was done by: (a) developing and refining the joint project proposals, (b) meeting with all universities and representatives of the National 4-H Council in Guanajuato to facilitate face-to-face contacts and beginning planning for a 1992 summer exchange, and (c) completion of the planning process by exchange visits of faculty and volunteer leaders to each other's campus, and by exchange of letters and telephone messages.

(2) Participants were selected and oriented (budgets determined that the delegation size would be about 20 participants). (3) Community development projects were selected for the delegations in each of the Mexican and U.S. sites. (4) The exchange was implemented with the Mexican delegation visiting its U.S. partner state for two weeks to live with host families and work on the designated community development project. Then the U.S. delegation followed its Mexican guests back to Mexico. The roles of guests and hosts were reversed for the last two weeks while the delegations worked on community development projects in each Mexican state.

(5) Extensive evaluation took place at various points of the projects. Pre- and post-evaluation questionnaires were prepared by the National 4-H Council to assess changes in skills, knowledge, and attitudes of participants. These were supplemented by quarterly reports from each university, interviews conducted and site visits by independent evaluators hired by the W. K. Kellogg Foundation, questionnaires sent by National 4-H Council to the parents of participants, and focus group interviews conducted with participants a few weeks after the end of the exchange. They also evaluated local activities such as orientations, community development activities, and host family reactions. (6) Each of the project coordinators from the ten institutions submitted an end-of-year report then met in Monterrey, November 18-20, 1992, to compare notes on successes and shortcomings of the 1992 exchange and to plan for the 1993 exchange.

An Improved Exchange Model

From the discussions among the ten project coordinators in November, 1992, a new model emerged. Since it was first proposed by the representatives of Penn State and the University of Monterrey to describe the process that they used, it is called the UDEM-PSU Model. The experience of the other four partnerships, however, was similar and their ideas were incorporated into the model described in figure 3.

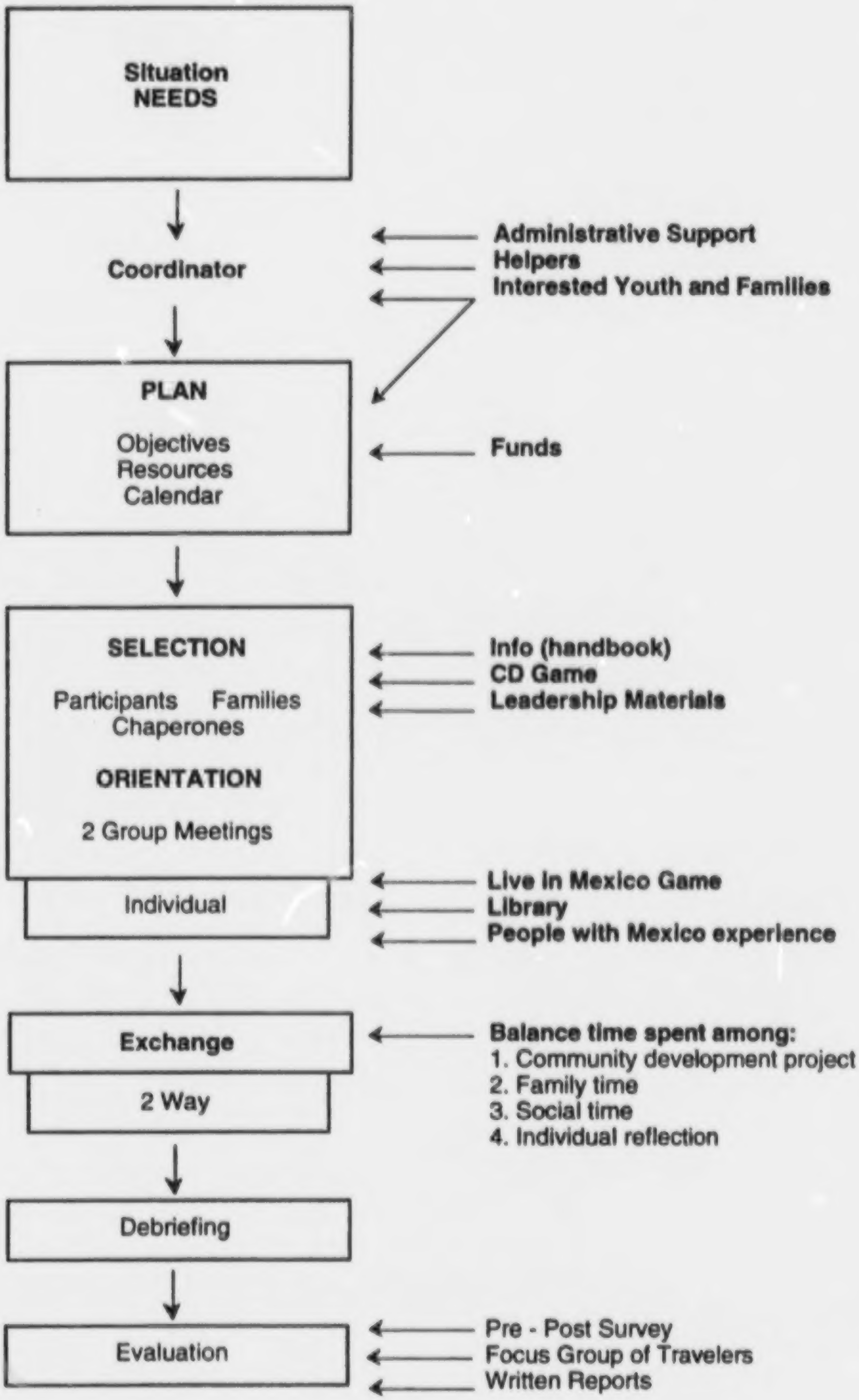
Collaboration was emphasized from the beginning. Constant communication meant that partners agreed on most of the decisions related to the exchanges. The Mexican institutions always had the last word concerning activities in Mexico and the U.S. institutions always had the last word concerning activities in the U.S. Collaboration was also included in the local planning for this exchange. Interested youth, their families, and county agents assisted in the planning and policy development.

A thorough program planning process was followed beginning with needs assessment and continuing through the determination of priorities, objectives, organization of resources, specific plans, implementation, and evaluation. Unlike the IFYE Ambassador model, planning for the UDEM-PSU included county 4-H agents and local volunteers and youth. Those who were involved in hosting and traveling were involved in planning, determining dates, and setting policies.

The grant enabled each partner to recruit lower-income participants and representatives of diverse ethnic groups. Orientation was done locally and at the state level. Local orientation was led by county agents and chaperones who had experience in Mexico and with other 4-H international exchanges. At the state level orientation was done during two day-long meetings. In addition to paperwork and logistics, the orientation was able to introduce the culture of the other country, provide information and skills in community development principles and techniques, and build teamwork among participants.

A board game similar to Trivial Pursuit, called "Living in Mexico" was designed at Penn State to help introduce youth and chaperones to Mexican culture. This game requires players to answer questions about currency, meals, etiquette, travel, shopping, safety, survival Spanish, religion, geography, weather, and everyday life at home. Copies of the game were given to each county delegation for use, when they chose, to help in preparations for the exchange.

Figure 3. UDEM-PSU MODEL


Situation
NEEDS
Coordinator
Administrative Support
Helpers
Interested Youth and Families
PLAN
Objectives
Resources
Calendar
Funds
SELECTION
Participants
Families
Chaperones
ORIENTATION
2 Group Meetings
Info (handbook)
CD Game
Leadership Materials
Individual
Live in Mexico Game
Library
People with Mexico experience
Exchange
2 Way
Balance time spent among:
1. Community development project
2. Family time
3. Social time
4. Individual reflection
Debriefing
Evaluation
Pre - Post Survey
Focus Group of Travelers
Written Reports

County 4-H agents helped participants choose an appropriate community development project for the two weeks that the Mexican delegation was in their state. In Mexico the exchange coordinators helped their youth to choose an appropriate community development for the binational teams while they were in Mexico.

During the exchange schedules were developed at each site. These schedules balanced participant involvement in four important activities: (1) the local community development project, (2) participation in family activities and time to get acquainted with the host family, (3) interaction in social situations with youth from the new culture who were not a part of the host family, and (4) individual reflection. Each participant was asked to keep a personal journal of reflections, questions, and observations.

The last component of this new model is "debriefing." Upon their return to their homes each participant was invited to a state meeting for evaluation and debriefing. During the debriefing delegates were led, through group discussion, to put their experiences and their new attitudes toward the other country in perspective. They were helped to see that visitors to another country typically experience four stages of perception: (1) the euphoric stage where everything is new, fascinating, and wonderful; (2) the culture shock stage where the charm wears off and the new country is compared to one's home country with the result that the new culture appears to be inferior; (3) the survival stage where the foreigner realizes that stage two is oversimplified and that survival depends on a more objective and accepting response to the positive and negative aspects of the new culture; and (4) the assimilation stage, usually after the visit has been completed, where the traveler is able to reflect on the experience and to decide which of the new skills, knowledge, and attitudes acquired will be retained and become a part of one's life style which includes a new world view.

Results

The extensive evaluations provided ample evidence that each objective had been met. Linkages between each of the partner universities were clearly strengthened. Project coordinators were named at each site. Each coordinator formed a committee to plan and implement the exchanges. In four of the U.S. universities the project coordinator was an extension specialist whose duties included the administration of international youth exchanges. For the Mexican institutions, no convenient faculty position existed. In each case an individual was named coordinator; but most of these individuals experienced an overload of responsibilities. Sustainability of the new exchange model, therefore, was threatened. Due to the position of most of the Mexican coordinators this exchange needs continuing financial support at the Mexican end. At any rate, a cadre of Mexican educators have gained experience in conducting youth exchanges.

Multiple evaluation approaches documented improvements in the knowledge, skills, and attitudes of participants. A simulation game was developed by Penn State faculty to teach the community development process to 4-H audiences. This game not only provided knowledge during orientation of participants but also helped youth gain community development skills by leading them through the planning process. The game was used again when the Mexican delegation arrived and met with their hosts to learn about the community development projects which they would collaboratively pursue in the U.S. Subsequent evaluation proved that participants learned the community development process from playing the game then applying the knowledge to their community development activities.

The local community development projects then provided experience in international community development with all of the accompanying differences in language and culture. Projects included large scale operations like the day camp in Monterrey for poorer neighborhood kids. In addition to the 46 participants in the Penn State/Monterrey team, this camp involved over 100 faculty and university students who planned and conducted the day camp for three weeks for approximately 3,000 campers from ages six to twelve. The camp was repeated in 1993 with similar numbers of participants involved.

At the other extreme were individual projects such as the U.S. high school student and her Mexican counterpart who organized and led a two-week workshop for inter-city youth in a "city parks and recreation" class on cross-cultural understanding through dance, drama, and food. They carried out their project alone with the only assistance coming from the local 4-H agent and an adult who volunteered to chaperone the Pennsylvania group to Mexico. In between those extremes were projects by county teams of four U.S. youth and four Mexican youth on environmental awareness, urban landscaping, constructing culture kits, and organizing mini-fairs and workshops on 4-H projects and Mexican culture.

Cost of the exchange was kept low. Some of the adult chaperones paid their entire airfare ($300-$600) and hosting expenses for their Mexican guests. Most of the youth paid half of the airfare. A few of the youth and chaperones had all fees paid by the grant.

Ethnic and economic diversity of participants was achieved through recruitment and selection criteria which were enforced by the National 4-H Council in selecting the states to receive grants. These criteria were also used by some of the states in the selection of youth participants and chaperones. Even though the W.K. Kellogg funding through the National 4-H Council ended after the 1993 exchange, four of the five partnerships planned exchanges for 1994.

Summary

The objectives set by the W. K. Kellogg Foundation as a condition for their grant were met. The pre- and post-assessments of participants documented changes in skills, knowledge, and attitudes related to Mexico, international issues, and community development. Focus group interviews of participants, upon their return, clearly indicated strengthened friendships between citizens of the two countries. Finally the new youth exchange model developed addresses the weaknesses of previous youth exchange models. Lower income youth can afford this type of international experience. The model provides a much stronger nonformal educational opportunity without reducing any of the opportunities for informal learning. The educational aspects of the exchange are not allowed to be diluted by commercial (travel company) considerations. Finally, development issues are directly addressed by bicultural teams who work on community development projects in both countries.

Educational Importance

In an increasingly multi-cultural world, learning about other cultures and developing cross-cultural survival skills is a critical need for tomorrow's world citizens. International group exchanges for youth are one of the most effective means of multi-cultural education. The disadvantages of expense and lack of quality control must be overcome if these exchanges are to be made possible for all youth. This paper describes a systematic attempt to address the problems with current international youth exchanges and find a stronger model.

A model for a low-cost youth exchange was developed which is unique. This model can be easily duplicated at the state, county, or community level for exchange groups to international destinations. The funds provided by the grant can be replaced by local fund raising. More than 15 community development projects, which were planned and conducted by youth, were successfully piloted. Educational quality was maintained by careful selection and orientation of participants, by collaborative planning among U.S. and Mexican educators, and by providing one chaperone for every eight participants.

This youth exchange model also addresses important issues of cross-cultural communication, jobs, and marketing. The community development skills which youth learned are directly relevant to vocations and professions. Workers of all types need to be aware of the global implications of their work and lifestyles. Workers need to understanding the importance of planning (analyzing a complex situation, determining priorities, setting goals and objectives, assessing resources, writing a plan, implementing the plan, and evaluating the plan). Citizens of the world need to understand that they can contribute to the local, district, state, regional, national, and global communities, to which they belong, in a concrete way--that they can make a difference individually and in groups.

These skills, knowledge, and attitudes are particularly important in Mexico and the United States at a time when Mexicans and U.S. citizens are exploring the implications of the "North American Free Trade Agreements." They are important world wide as conditions constantly change--as new problems and opportunities continually emerge.

Finally, global citizenship through 4-H, FFA, and other nonformal educational programs for youth must continue to receive support form the organizations and institutions on which they depend. Economic difficulties mean that educational institutions will cut programs. They must have models of successful programs which can address the long term economic pressures. Otherwise they may eliminate the very programs that provide the long term solutions to the short term economic pressures.

PERCEPTIONS HELD BY SECONDARY SCHOOL AGRICULTURAL EDUCATORS IN IOWA REGARDING ADDING A GLOBAL PERSPECTIVE TO THE AGRICULTURE CURRICULUM

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Introduction

It appears that the curriculum developed by some agricultural educators has been expanded to provide a more international perspective. "Within recent years, agricultural educators have become increasingly aware of a necessity to view the profession from a global perspective (Welton, 1987, p. 6). As Welton suggests, some agricultural educators believe in the importance of providing a global perspective to their curriculum.

It is reasonable to ask "Why should international concepts be integrated into the curriculum?" One reason is that the world has changed and the United States is part of a global society (McCracken and Magisos, 1989). By 1989, four out of five jobs existed as a direct result of foreign trade; and over 6,000 North American companies had branch offices in the United States (Cushner, 1990, p. 166). From this point of view, a curriculum that promotes an international or global perspective should address several dimensions to provide students a better opportunity to have a broad view of the world in which they live.

Agricultural educators need to recognize the importance of world trade. Some of them are already addressing a variety of global issues in their classrooms. However, a research report presented by Welton (1990) during the 1990 annual meeting of the Association for International and Extension Education recommended that: Agricultural education student awareness about international agriculture in the areas of agricultural products, agricultural policy, geography, people and cultures is limited." Efforts to teach secondary agricultural education students about international agriculture should be accelerated; and further research should be conducted to identify specific international concepts that should be taught in agricultural education.

Steve McKay, a high school agriculture instructor from California, created learning activities that show the economic, social and cultural interdependence among countries as well as international agricultural development issues (Moss, 1988). Gary White, a former high school instructor at North Fayette High School (Iowa) proposed several practical strategies to infuse international activities into agricultural education programs. Two of the activities listed by White are: the significance of import potential and export history should be included in crop and animal science units; and agricultural marketing classes should include information on how international policy changes affect U.S. markets. He stated that international activities sparked student interest and better prepared students for agricultural careers when he included them in his curriculum (White & Henderson, 1990, p. 23).

According to Maxwell (1990, p. 6) "forces of interdependence are working at unprecedented speeds and levels of complexity for all countries." From this point of view, activities done by people in one country can have a direct or indirect impact on other countries. Lately, Americans are becoming more aware of the relevance of a global perspective in their educational systems.

Purpose of the Study

The main purpose of this study was to determine the perceptions of agriculture at the secondary level in Iowa regarding adding a global perspective to the agriculture curriculum. A secondary purpose was to provide recommendations to curriculum developers regarding appropriate activities and issues that can be infused into the agriculture curriculum at the secondary level in order to provide students a global perspective. In order to accomplish the purpose of the study, the following objectives were developed:

1. Identify activities/issues used by agricultural education teachers in Iowa high schools to infuse a global perspective into the curriculum.

2. Identify perceptions of secondary educators toward international agricultural issues and activities into the curriculum.
3. Examine the differences in perceptions held by Iowa agriculture educators regarding adding a global perspective to the curriculum at the secondary level.
4. Develop recommendations for curriculum planners that may be useful in setting an approach toward a global perspective in the agriculture curriculum.

Methodology

This study was conducted using the descriptive survey method. According to Ary et al. (1990), descriptive surveys focus on determining the status of a defined population with respect to certain variables. Also, they are used as a method of research for sociology, and education among other fields of the behavioral sciences. The target population of the study consisted of agricultural education teachers working at the secondary level in Iowa. Then, using a table of random numbers, a random sample of 128 teachers (50%) was drawn from the total population of 255 agriculture teachers working at the second level. A mailed questionnaire was used as the instrument to collect the data. The researcher used an abbreviated version of an instrument developed by Dr. Robert Martin, Associate Professor at ISU, who was conducting a similar study at the national level. The content validity of the instrument had already been verified by a panel of experts in the field as well as teachers involved in international experiences.

The questionnaire was divided into three main sections as follows:
Section I: **Potential topics related to international agriculture.** This section was further divided into seven sub-sections: (1) Global farming systems, (2) Global marketing system, (3) Global trading systems, (4) Global food products, processing and consumption systems, (5) Global resource management systems, (6) Socio-cultural impacts of international agriculture, and (7) World geography.
Section II: **Perceptions of agricultural teachers regarding adding a global perspective to the agriculture curriculum.**
Section III: **Demographic Information.**

For section I, two columns (A & B) were used to answer each of the questions. For column A, a check list (Yes or No) was used in order to identify if the topic listed under the question was taught or not. Then, column B, (using a five-point Likert-type scale) was used to indicate the degree of willingness to teach the topic listed if teacher inservice and materials were offered. For Section II, only column B was used. The five-point Likert-type scale was structured as follows: 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree. However, a criteria was set to indicate that those items/topics within Section I (Column B) which fell into a mean of at least 3.5 should be taken into consideration by curriculum planners as important topics for future inservice and material training programs.

Out of the 128 agriculture education teachers, 82 responded, which represents a response rate of 64.04%. Data collected were coded and entered onto a WYLBUR file, then analyzed using the Statistical Package for the Social Sciences (SPSS). The following procedures were performed in order to analyze the data:

1. FREQUENCIES were used to analyze means, frequency counts, standard deviations, and percentages (descriptive statistics).
2. RELIABILITY (Cronbach's alpha) was used to test the internal consistency of the items in the survey and to do an exploratory analysis.
3. ONE-WAY was used for analysis of variance to determine if significant differences in perceptions existed among Iowa agriculture education teachers when grouped by demographic variables such as age and years of teaching experience.
4. T-test was used to calculate t-values for difference in responses when agricultural education teachers were grouped into two levels.

Results

1. Almost half (47.44%) of teachers had 6 to 15 years of teaching experience.

2. Approximately half (50%) of the teachers had received instructional materials for adding a global perspective to agricultural education programs.
3. About 50% of the teachers reported that they had read about international issues in The Agricultural Education Magazine.
4. Sources of information related to international issues used by the teachers were: agricultural magazines (40.43%), newspapers (38.28%), with The Des Moines Register as the most frequently read, followed by Newsweek (10.64%), and Farm Journal (10.64%).
5. More than three-fourths (78.21%) of the teachers had not received any foreign language instruction.
6. Slightly more than one-fourth (28.21%) of the teachers had the experience of hosting a person from another country.
7. Close to one-third (32.05%) of the teachers had been involved in an international experience outside of the U.S.
8. More than two-thirds (69.23%) of the teachers had a person from another country serve as a resource person to their students in class.
9. It was observed that the following topics were taught by the majority (teachers) at the time this study was conducted. A complete list is found on Table 1. The topics are listed in descending order:
    - A. List the agricultural exports of U.S. to selected countries.
    - B. List major crops grown in selected countries.
    - C. Explain selected aspects of the international marketing system.
    - D. Explain the trade relationship of at least one country with the U.S.
    - E. Explain the importance of renewable and non-renewable resources in the world.
    - F. Describe climatic conditions in selected countries.
    - G. Identify the origin of major crops of the world and their interrelationship.
    - H. Locate on a map each of the major agricultural regions of the world.
    - I. List the largest meat exporters of the world.
    - J. List the largest exporters of major cereals grains of the world.
    - K. Compare and contrast U.S. measuring system with the metric system.
    - L. Compare and contrast the marketing system of the U.S. and at least one other country.
    - M. Locate on a map each of the continents of the world.
    - N. Identify the major crops grown in each of the continents of the world.
10. The findings also showed that after inservice education and materials other topics would likely be taught by a majority (teachers).
11. Out of the 60 topics listed in Section I of the instrument, 25% were already being taught by a majority of teachers, and an additional 11.66% out of the 60 topics would be taught after inservice education and materials.
12. Among the main international agriculture activities that teachers had conducted with their students, the following were found:
    - A. Discussion of environmental issues around the world.
    - B. Discussion imports/exports, countries that affect the U.S. markets.
    - C. Discussion about how culture affects consumption and trade.
    - D. Reading of newspaper articles and magazines.
    - E. Slide shows.
    - F. Talks with foreign visitors.
    - G. Inviting people who have traveled to other countries to talk to the class.
    - H. Hosting foreign visitors in class.
    - I. Student exchange programs.
13. Teachers perceived the following statements as important (mean above 4.00) within the context of international agriculture (Table 2.):
    - A. International agricultural programs will enable students to learn about systems of agriculture in cultures and societies around the world.
    - B. International agricultural programs will enhance student understanding of linkages and interdependencies of cultures.

Table 1. Topics in international agriculture.

I. Global Farming Systems

A. Identify farming techniques used in selected countries
B. Explain the effects of use of pesticides on different environments of the world
C. Describe climatic conditions in selected countries
D. Compare and contrast "family farming" in selected countries
E. Match agricultural machinery needs to availability and appropriateness of machinery in selected countries
F. Explain the methods of transferring new technologies to farmers
G. Describe the various mechanisms of insect pest and disease control of crops and livestock in selected countries
H. Identify the origin of major crops of the world and their interrelationships
I. Compare a labor intensive agricultural system in a given country with a mechanized agricultural system in another country.
J. List major crops grown in selected countries
K. Explain the impact of seasons on agricultural production in a given country
L. List the different methods of irrigation in selected countries
M. Compare and contrast the use of intensive agricultural land use practices to a more open and less intensive system of land use.

II. Global Marketing System

A. Explain selected aspects of the international marketing system
B. Explain the operation of a local "farmers markets" selected countries
C. Explain the relationship between production and marketing of food products of a given country
D. Describe the impact of transportation systems on agricultural marketing in developed and less developed countries
E. Compare and contrast the marketing system of the USA and at least one other country
F. Discuss the seed marketing system of a given country
G. Explain the impact of government policy on production and marketing of various commodities in selected countries
H. Compare and contrast U.S. measuring system (in lb; oz; ft; inches; etc.) with metric system

III. Global Trading Systems

A. List the agricultural exports of U.S. to selected countries
B. List the largest exporters of major cereals grains of the world
C. List the largest meat exporters of the world
D. List the largest producer and exporter of sugar
E. Explain the trade relationship of at least one country with the U.S.A.
F. Identify the monetary systems of selected countries
G. Identify vegetables that are grown in one country and shipped to another country
H. Explain the U.S.A. government policy on trade of agricultural products with other countries
I. Explain selected countries' trade policies (ie. European Common Market, Japan)
J. Identify trends in world food trade

Table 1. Continued.

IV. Global Food Products, Processing and Consumption Systems
    A. Trace a food commodity produced in one country to its eventual consumption in another country
    B. Explain the food processing techniques used in selected countries
    C. Describe food storage techniques in selected countries
    D. Explain the relationship between food production and nutrition in selected countries
    E. Explain the food policy in U.S.A. and selected countries
    F. List major sources of energy based foods of the developing countries
    G. List major sources of protein based food of the developing countries
    H. List some of the countries that have the highest rates of people who suffer from malnutrition in the world
    I. Define the term "food security" and its relevance to developing countries

V. Global Resource Management Systems
    A. Identify soil conservation practices used in selected countries
    B. Explain the importance of renewable and non-renewable resources in the world
    C. Enumerate major natural resource management problems in developing countries
    D. Identify and explain water use and management in selected countries
    E. List the wildlife resources of selected countries
    F. Discuss the impact of Green Revolution agriculture on natural resource management in selected countries
    G. Discuss the effects of deforestation in selected countries
    H. Explain mixed cropping systems

VI. Socio-cultural Impacts of International Agriculture
    A. Explain the value of local agriculture knowledge in developing countries
    B. Explain the impact of language of a country on agricultural systems
    C. Explain the linkages between religion and diet
    D. Explain the impact of land tenure systems on agricultural productivity
    E. Discuss the interactions between urban and rural communities of a given country
    F. Describe the role of children in farming in selected countries
    G. Describe the role of women in agriculture in selected countries

VII. World Geography
    A. Locate on a map each of the continents of the world
    B. Locate on a map each of the major agricultural regions of the world
    C. Identify the livestock grown in each of the major regions of the world
    D. List five of the longest rivers in the world
    E. Identify the major crops grown in each of the continent of the world.

Table 2. Perceptions of agriculture teachers regarding adding a global perspective to the agriculture curriculum, means and standard deviations

Name of the item	Mean	Sd.
A. International agricultural programs will enable students to learn about systems of agriculture in cultures and societies around the world	4.01	.89
B. International agricultural programs will enable students to adapt to change and accept ambiguity	3.61	.81
C. International agriculture programs will help students to resolve conflicts in constructive ways	3.11	.81
D. International agriculture programs will enhance student understanding of linkages and interdependencies of cultures.	4.01	.81
E. International agriculture programs will provide an opportunity to students to interact with people around the world	3.82	1.00
F. Stimulating farm production in a developing country can actually lead to increased demand for USA agricultural products	3.35	1.03
G. Understanding other cultures helps students recognize the ethnic groups within local communities	3.69	.94
H. The infusion of international perspectives into agricultural programs will better prepare students for future agricultural careers	3.97	.95
I. Infusing international agriculture could increase enrollment and improve the academic capabilities of students	3.22	1.03
J. Students need a global perspective if they are to be functional and vital citizens of the world	3.82	.99
K. Changes in quality and quantity of food and fiber production in other countries will influence the marketing system of agricultural products in USA	4.03	.94
L. International agricultural programs enhance the understanding of the impact of culture and religion on global agriculture	3.67	.95
M. Students will gain a knowledge about agricultural trade practices around the world and its impact on the trade systems of the USA, if international agriculture is studies	4.03	.91
N. Graduates of agricultural education may compete for careers in multinational corporations	3.79	.98
O. International agriculture programs will help students understand agricultural marketing systems	3.95	.83
P. International agriculture programs should be given a high priority because US agriculture will benefit from it	3.40	.98
Q. Agriculture teachers need in-service training to internationalize their programs	4.15	1.06
R. I need resource materials to infuse international agriculture into my classroom	4.31	.97
S. Adding a global perspective to the curriculum in agriculture education represents a challenge	4.23	.98

    C. Changes in quality and quantity of food and fiber production in other countries will influence the marketing system of agricultural products in U.S.
    D. Students will gain knowledge about agricultural trade practices around the world and its impact on the trade systems of the U.S., if international agriculture is studied.
    E. Agriculture teachers need inservice training to internationalize their programs.
    F. I need resource materials to infuse international agriculture into my class.
    G. Adding a global perspective to the curriculum in agriculture education represents a challenge for the teachers.

14. According to the results of a t-test analysis regarding adding a global perspective to the curriculum when teachers were grouped by having foreign language training, there were no significant differences (alpha = .05) between those teachers who had foreign language training and those who did not.
15. Four significant differences were found in a second t-test analysis regarding perceptions about adding a global perspective to the agriculture curriculum when teachers were grouped by having been involved in an international experience outside of the U.S. The t-test showed that the four differences were possibly influenced by those teachers who have had an international experience outside the U.S. The group with international experience showed the highest means in all four instances.
16. A third t-test analysis regarding perceptions about adding a global perspective to the agriculture curriculum when teachers were grouped by having received instructional materials related to international issues, seven significant differences were apparently influenced by those teachers who had received instructional materials, this group showed the highest means in each of the seven differences (alpha = .05).
17. No significant differences regarding perceptions for adding a global perspective to the curriculum were found in a fourth and fifth t-test analysis when teachers were grouped by having read international issues in The Agricultural Educational Magazine and hosted a foreign person, respectively.
18. One-way analysis for perceptions regarding adding a global perspective to the curriculum when teachers were grouped by years of teaching experience showed no significant differences.

Conclusions

In general, teachers were adding a global perspective into their agriculture curriculum. Results showed that 25% of the topics listed in the instrument were being already addressed by a majority of teachers. Therefore, it can be concluded that agriculture education teachers at the secondary level in Iowa were aware of the importance of dealing with international issues into their curriculum. This was supported by findings in the second section of the instrument where most of the teachers perceived the fact of adding a global perspective to the agriculture curriculum as an important component within their role as agriculture education teachers.

Teachers recognized, however, that they need additional inservice education training and more materials in order to internationalize their programs. This means that inservice education as well as written materials should be initiated right away in order to support teaching endeavors to add a global perspective to the agriculture curriculum.

On the other hand, teachers who had an international experience outside the U.S. appeared to be more conscious about the importance of adding a global perspective to the curriculum. Therefore, opportunities to travel outside of the U.S. boundaries for agriculture education teachers should be encouraged in order for them to become more knowledgeable about international issues related to international agriculture.

Even when 25% of the international issues listed in the first section of the instrument were already being addressed by the teachers, only slightly more than one-third additional topics would be taught by a majority after inservice education and materials. Consequently, endeavors aimed to organize inservice education and availability of materials should be focused on the topics already being addressed by the teachers as well as the additional topics in which teachers showed interest in teaching after inservice education and new materials.

Although about two-thirds (68%) of the teachers did not have international experience outside the U.S. some of them were developing activities such as:

A. Having guest speakers who had traveled outside the U.S. to talk with the class.
B. Hosting through their students foreign persons.
C. Working on student exchange programs through FFA.

Once again, this showed that teachers were aware of the importance of adding some international activities to their curricula.

The Agricultural Education Magazine seemed to be a relatively important source of current events in international agriculture used by 50% of the teachers. Therefore, those people in charge of editing this magazine should be encouraged to include a greater variety of topics related to international issues. If so, perhaps more teachers would become interested in this resource.

The variable "age" did not influence how teachers perceived the task of adding a global perspective to the curriculum. Most of them, regardless of their age, perceived a global perspective as an important aspect to be included in their agriculture curricula.

Educational Importance

If a global perspective curriculum is not included within the agricultural curriculum, teachers and students will miss out on a great amount of knowledge that could strengthen agricultural education. An understanding of international agriculture is becoming not only important, but also a need to every one who is directly or indirectly involved in the agriculture sector. This study shows that agricultural education teachers not only are aware of the importance of adding a global perspective to the curriculum, but also they are making an effort to include learning activities in international agriculture to their course outlines. In light of this fact, those who develop teaching materials, and those who provide inservice education should use this study as one source for possible learning activities to add a global perspective to the study of agriculture at the secondary level.

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DEVELOPMENT OF VOCATIONAL AGRICULTURE IN SWAZILAND: PERSPECTIVES OF SWAZILAND AGRICULTURAL PROFESSIONALS

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DEVELOPMENT OF VOCATIONAL AGRICULTURE PROGRAMS IN SWAZILAND: PERSPECTIVES OF SWAZILAND AGRICULTURAL PROFESSIONALS

Introduction and Theoretical Foundation

The educational reform to vocationalize the secondary curriculum of agricultural, commercial (business), home economics, and technical studies in Swaziland is perceived by the policy makers as the potential for providing the pathway to wage employment or self-employment for high school leavers (National Education Review commission, 1985). The high school leavers who do not go on to university or for postsecondary education constitute the majority of high school graduates. To cater to the educational and personal needs of these young people, the Swaziland government finds itself compelled to engage in secondary school curriculum vocationalization of the practical arts studies. This reform is a response to emerging features of structural unemployment.

Policy makers in the Ministry of Education tend to attribute youth unemployment to lack of linkages between formal schooling and occupations in the workplace. Psacharopoulos (1985) expressed that" it is commonly thought that introducing a vocational element in the secondary school curriculum, especially in developing countries, is conducive to economic development" (p. 589). Vocational education at the secondary school level is aimed at preparing the youth for initial entry employment. It is economic education as it is geared to the needs of the job market and, thus, contributing to national economic strength (Calhoun & Finch, 1982).

Closely intertwined with and linked to this educational reform in Swaziland in which youth and high school graduates are prepared for initial job entry, is teacher preparation (Mndebele & Crunkilton, 1993). This reform suggests a change in Swaziland's educational system in teacher preparation, that is, development of a contemporary vocational teacher education curriculum within the context of Swaziland.

The concept of competence was central to this investigation. Teacher competence in the context of professional vocational education has implications for the improvement of teacher performance. Short (1985) explained that:

> To be able to demonstrate competence as a particular behavior or performance is necessarily to be able to demonstrate something very specific and limited. To specify behaviors, as is done in behavioral objectives, or to specify performance, as is done in performance testing is to designate acts that can be accomplished quite independently of any ongoing purpose of intent. (p. 4)

Short (1985) presented four conceptions of competence: (a) competence as behavior or performance; (b) competence as command of knowledge; (c) competence as level of capability deemed sufficient; and (d) competence as a quality of a person or a state of being. Apparently, the conception of competence is perceived to be the doing of particular things, behaviors or performances. Finch and Crunkilton (1994) in their discussion of the assumptions underlying Competency-Based Education (CBE), stated that "at the core of CBE is competency" (p. 242).

Shippy (1981) conducted a study to determine professional vocational competencies needed by beginning vocational agriculture/agribusiness teachers as perceived by selected vocational agriculture teachers and vocational agriculture supervisors. A questionnaire of 240 professional vocational competencies was developed with vocational teacher competencies divided into the following categories: (a) program planning, development, and evaluation; (b) planning of instruction; (c) execution of instruction; (d) evaluation of instruction; (e) student vocational organization; (f) supervised occupational experience; (g) management; (h) guidance; and (i) school-community relations, and (j) professional role and development (p.30). On rating the competencies, the two groups, teachers and supervisors, placed approximately the same emphasis on the importance of the professional vocational competencies.

Stewart, Lighari and Gott (1983) compared the perceptions of administrators with those of agricultural educators concerning the professional competencies needed by vocational agriculture teachers and found that there were significant differences among the mean scores of administrators and agricultural educators regarding the importance of the competencies. The 209 competencies rated were organized into 13 competency categories.

Findlay (1992) identified the methods by which vocational agriculture teachers acquired their professional agricultural education competencies in seven competency areas. The results revealed that the teachers perceived themselves as having acquired the majority of the competency areas through college courses, on-the-job activities and through home-study, other than in student teaching. In the same study, Findlay also identified the perceived levels of competence possessed by these teachers in each of the seven competency areas. Data revealed that the teachers perceived themselves as having higher levels of competence in the competency areas of: program planning; teaching techniques; guidance and counseling; supervised agricultural experience; leadership skills; and school and community relations.

Purpose

The purpose of the study was to determine the preparation that must be provided to current and prospective teachers of agriculture to enhance their delivery of instruction, procurement and utilization of equipment and facilities, and program planning and development of a proposed vocational agriculture program for Swaziland. The specific objectives were: (1) determine the relative importance of the professional vocational education competencies in the competency areas of program planning and development, facilities and equipment, and planning and executing instruction for vocational agriculture teachers; and (2) determine if statistical differences existed between importance and performance perceptions of the agricultural teachers on the professional vocational educators competencies in the competency areas of program planning and development, facilities and equipment, and planning and executing instruction.

Methodology

Development of the professional vocational competencies was completed in two one-day focus group workshops with Swaziland professionals: (a) teacher educators; (b) curriculum development specialists; and (c) senior inspectors (supervisors), from the four specialty areas of agricultural, commercial (business), home economics, and technical studies (Mndebele & Crunkilton, 1993).

The results of the workshops were a profile of 161 competencies organized into 11 competency areas. From the profile of competencies, a questionnaire was formulated with importance and performance measurement scales with values on each scale ranging from 5 to 0 (very high importance to no importance of the competency) and 5 to 0 (excellent ability to no ability to perform the competency). The questionnaire of 161 competencies was validated and pilot tested in Swaziland. A random sample of 57 agricultural teachers from a population of 200 were sent the questionnaire (Hinkle, Oliver & Hinkle, 1985). A 100% rate of return was obtained. For purposes of this paper, three competency areas were analyzed and presented. The Cronbach's reliability coefficients for all responses for the three competency areas for importance and performance scales were as follows: program planning and development, .82 (importance) and .87 (performance); facilities and equipment, .89 (importance) and .93 (performance); and planning and executing instruction, .90 (importance) and .92 (performance).

Results and Conclusions

To answer research question one, mean scores for each competency were computed on the "importance" rating. Mean importance ratings among the competencies were determined based on the scale corresponding to the importance scale utilized in the survey questionnaire, with midpoints used for interpretation (Kirby & Browning, 1990). The measurement scale utilized for data analysis to determine the relative importance of each competency reflecting practical importance is given as: 4.50-5.00 of very high importance; 3.50-4.49 of high importance; 2.50-3.49 of medium importance; 1.50-2.49 of low importance; 0.50-1.49 of very low importance; and 0.00-0.49 of no importance.

Data in Table 1 of the competency area, Program Planning and Development revealed that 13 of the 15 competencies were rated as of "high importance."

The highest mean rating was for the competency, "Implementing a vocational technical education program in a rural school environment" (4.35). The two remaining competencies were both rated as of "medium importance" with the competency, "Communicating Swaziland Labor Laws to vocational technical education students" (3.23) rated lowest in importance.

In the competency area, Facilities and Equipment, 16 of the 17 competencies were rated as of "high importance" as revealed in Table 2. The competency rated highest in importance and falling in the "very high importance" category of the importance measurement scale was, "Providing safety measures for vocational technical education students using hazardous equipment/materials" (4.63). The lowest rated competency in importance was "Designing a system for determining and collecting student fees for consumable vocational technical education supplies" (3.67), a "high importance" mean rating.

Data in Table 3 showed mean values in the competency area, Planning and Executing Instruction. Of the 17 competencies, 16 were rated as of "high importance." The one remaining competency rated as of "very high importance" was "Creating an environment that facilitates learning of vocational technical subjects" (4.50). On the other hand, the lowest rated competency was, "Demonstrating identified performance competencies to vocational technical students" (3.77), a "high importance" rating.

To answer research question two, paired t-tests were computed with a hypothesized mean difference of zero to determine if statistical significant mean differences existed between importance and performance mean values. The alpha was set at .05.

Data in Tables 1, 2 and 3 for competency areas, program Planning and Development, Facilities and Equipment, and Planning and Executing Instruction revealed all 49 mean competency values being significantly different. The mean importance and performance values were statistically significant from a hypothesized mean difference of zero.

In respect of research question one, it can be concluded that respondents rated most of the competencies as of "high importance." Of the 49 competencies analyzed in this study, two were rated as of "medium importance," two were rated as of "very high importance," and 45 competencies were rated as of "high importance." Respondents, agricultural teachers, perceived the competencies in the three competency areas of Program Planning and Development, Facilities and Equipment and Planning and Executing Instruction as important and, thus, relevant to the vocational agricultural teachers' needs in Swaziland. These vocational competencies must be incorporated in both the preservice and inservice vocational teacher education programs.

In regard to research question two, all 49 competency mean values between importance and performance mean values, were statistically significant from a hypothesized mean difference of zero. It can be concluded from these results that the self-perceived performance of respondents calls for an inservice vocational teacher education program to remedy the discrepancy between importance and performance ratings of the competencies.

Educational Importance

The findings of this study are useful to teacher educators, school inspectors, and curriculum development specialists who are involved in the proposed reforms and improvements in vocational agriculture in Swaziland. The strategic approach and the content may be useful and adapted by Southern African Development Community (SADC) countries as they too, address youth unemployment problems by vocationalizing the secondary curriculum.

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Table 1.

Means and T-Values of Program Planning and Development Competencies for Swaziland Vocational Agriculture Teachers

Competency	Importance mean sd n=57	Performance mean sd n=57	T-Value
1. Developing materials for conducting a community survey on needs for a vocational technical education program.	4.30 .76	3.33 .97	7.57*
2. Outlining activities and procedures for conducting a community survey on needs for a vocational technical education program.	4.12 .85	3.37 .96	5.57*
3. Conducting a community survey to identify local employer demands for vocational technical education programs consistent with needs of students, community, and society.	4.21 .94	3.37 1.14	5.47*
4. Cooperating with a vocational technical education advisory committee in selecting and developing a vocational program that reflects present and future trends of Swaziland's economy.	4.26 .88	3.46 1.21	4.50*
5. Explaining the Swaziland Government vocational technical education philosophy/principles/policies.	3.82 1.07	2.60 1.31	7.39*
6. Interpreting the Swaziland Industrial and Training Acts.	3.26 1.03	2.35 1.22	5.25*
7. Communicating Swaziland Labor Laws to vocational technial eduation students.	(3.23) 1.23	2.14 1.32	6.07*
8. Interpreting national manpower and labor statistics to develop-revise vocational technical education curricula.	3.79 1.03	2.54 1.34	7.56*
9. Determining the Swaziland teachers' beliefs about vocatinal education on planning, implementing and evaluating vocational technical education.	3.88 1.07	2.77 1.15	6.33*
10. Evaluating the influence of Swaziland teachers' beliefs about vocational technical education on planning, implementing, and evaluating vocational technical education program.	3.84 1.03	2.84 1.08	6.24*
11. Articulating/coordinating the secondary/high school vocatinal technical education program with the postsecondary vocational education centers/institutions, Swaziland College of Technology, and Unviersity of Swaziland.	4.18 .89	3.25 1.33	5.55*
12. Identifying persons to be served by a vocational technical education program.	4.00 1.07	3.18 1.20	6.10*
13. Interpreting occupational information and community survey data.	3.63 .90	2.93 1.12	5.21*
14. Implementing a vocational technical education program in a rural school environment.	(4.35) .83	3.40 1.33	5.08*
15. Implementing a vocatinal technical program in an urban school environment.	3.84 1.00	3.04 1.25	4.73*

*p< .05 Significance level
Importance Scale: 5=of very high importance; 4=of high importance; 3=of medium importance; 2=of low importance; 1=of very low importance; 0=of no importance
Performance Scale: 5=of excellent ability to perform; 4=of very good ability to perform; 3=of good ability to perform; 2=of fair ability to perform; 1=of poor ability to perform; 0=of no ability to perform
() Represents the highest and lowest ranking means within competency area.

Table 2

Means and T-Values of Facilities and Equipment Preparation Competencies for Swaziland Vocational Agriculture Teachers

Competency	Importance mean sd n=57	Performance mean sd n=57	T-Value
1. Compiling a list of vocational technical education consumable supplies needed for the school year.	4.37 64	3.47 1.07	6.56*
2. Identifying new vocational technical education tools and equipment needed for the school year.	4.26 67	3.37 1.22	5.67*
3. Preparing a capital outlay budget proposal for vocational technical education program.	4.35 .74	3.51 1.18	5.70*
4. Preparing an operational budget proposal for a vocational technical education program.	4.23 .76	3.32 1.14	6.85*
5. Preparing purchase requests of vocational technical equipment and supplies for approval.	3.95 .81	3.02 1.08	6.20*
6. Designing a system for determining and collecting student fees for consumable vocational technical education supplies.	(3.67) 1.07	2.95 1.26	4.20*
7. Providing data for vocational technical education reports required by the Ministry of Education, inspectorate division.	4.05 .95	3.28 1.06	6.29*
8. Providing safety measures for vocational technical education students using hazardous equipment/materials.	(4.63) .56	3.56 1.21	6.69*
9. Formulating with students acceptable standards of behavior in vocational technical education classrooms and laboratories/workshops.	4.05 .92	3.45 1.17	4.23*
10. Maintaining an inventory of vocational technical education tools, supplies, and equipment.	4.40 78	3.88 .98	4.58*
11. Designing a system for repairing and servicing vocational technical education tools and equipment.	4.23 .80	3.19 1.22	5.74*
12. Providing for the storage and security of vocational technical education tools and equipment.	4.42 .82	3.60 .92	5.90*
13. Designing student check-out procedures for vocational technical education laboratory/workshop equipment, tools and supplies.	4.25 .71	3.54 1.02	4.96*
14. Directing students in a system for cleaning and maintaining the vocational technical education laboratory/workshop.	4.23 .80	3.60 .98	4.98*
15. Arranging layout of the vocational technical education laboratory/workshop to simulate the occupational workplace environment.	4.14 .77	3.33 1.09	5.66*
16. Formulating a policy for use of the vocational technical education facilities and equipment by other school personnel and groups outside the school.	4.01 1.09	3.07 1.39	6.75*
17. Providing for the first aid needs of vocational technical education students.	4.28 .84	3.16 1.18	6.22*

*$p < .05$ Significance level
Importance Scale: 5=of very high importance; 4=of high importance; 3=of medium importance; 2=of low importance; 1=of very low importance; 0=of no importance
Performance Scale: 5=of excellent ability to perform; 4=of very good ability to perform; 3=of good ability to perform; 2=of fair ability to perform; 1=of poor ability to perform; 0=of no ability to perform
() Represents the highest and lowest ranking means within competency area.

Table 3.

Means and T-Values of Planning and Executing Instruction Competencies for Swaziland Vocational Agricultural Teachers

Competency	Importance mean sd n=57	Performance mean sd n=57	T-Value
1. Stating vocational technical instructional objectives in student performance terms.	4.35 .74	3.70 1.09	6.03*
2. Classifying vocational technical instructional objectives into cognitive, psychomotor and affective domains.	4.09 .89	3.53 1.07	4.40*
3. Using audio and visual equipment appropriate for a vocational technical lesson.	4.32 .74	3.63 1.06	6.24*
4. Applying vocational technical education instructional techniques, materials and learning tools appropriate for the lesson objective.	4.46 .71	3.75 1.07	5.30*
5. Identifying sites for field trips that provide learning environments.	4.39 .76	3.75 1.14	3.99*
6. Developing opportunities for vocational technical students to observe and analyze a variety of occupational work facilities.	4.07 .88	3.26 1.22	5.13*
7. Demonstrating competency in using a variety of teaching methods in vocational technical education such as problem-solving, simulations, discovery, role play, discussion, projects.	4.30 .98	3.63 .96	4.00*
8. Demonstrating ability to communicate to vocational technical students contemporary trends and issues in the content/specialty area.	3.88 .85	3.23 1.12	4.95*
9. Creating an environment that facilitates learning of vocational technical subjects.	(4.50) .63	3.59 .99	6.97*
10. Sequencing vocational technical instructional units (scheme of work) to enhance student learning.	4.21 .88	3.70 1.02	4.77*
11. Adapting instructional activities and materials to enhance achievement of vocational technical education program goals and objectives.	3.98 .83	3.33 1.04	5.24*
12. Developing instructional materials and strategies which adequately support vocational technical education programs when such materials are needed.	4.00 .80	3.12 1.04	6.86*
13. Incorporating current educational research and development findings on student learning into vocational technical instructional practices.	3.95 .95	3.09 1.14	5.27*
14. Developing a lesson plan for a vocational instructional unit.	4.21 1.04	3.70 1.21	4.32*
15. Designing assessment instruments to measure vocational technical students' progress.	4.23 .99	3.46 1.16	5.80*
16. Demonstrating identified performance competencies to vocational technical students.	(3.77) 1.01	3.23 1.22	4.13*
17. Performing daily vocational technical instructional tasks with minimal supervision.	3.88 1.18	3.25 1.27	5.28*

*p<.05 Significance level
Importance Scale: 5=of very high importance; 4=of high importance; 3=of medium importance; 2=of low importance; 1=of very low importance; 0=of no importance
Performance Scale: 5=of excellent ability to perform; 4=of very good ability to perform; 3=of good ability to perform; 2=of fair ability to perform; 1=of poor ability to perform; 0=of no ability to perform
() Represents the highest and lowest ranking means within competency area.

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Session K PARTICIPATION IN EXTENSION

1. **Extension Serving Women Farmers: An Analysis of the M.A.R.E. Project's Contribution to Smallholders in Malawi**
   Vicki Morrone

2. **Nonformal Education for Empowerment: The Case of the Learning Groups in Lembang, Indonesia**
   Naana O. Nti
   Arlen W. Etling

3. **Factors Influencing Rural Women Cassava Processors' Intended Participation in an Agricultural Extension Education Program**
   Christian O. Ojomo
   N. L. McCaslin

4. **"There is always another mat to weave": Invisible Women Farmers in Western Samoa**
   Ruth Beilin

EXTENSION SERVING WOMEN FARMERS: AN ANALYSIS OF THE M.A.R.E. PROJECT'S CONTRIBUTION TO SMALLHOLDERS IN MALAWI.

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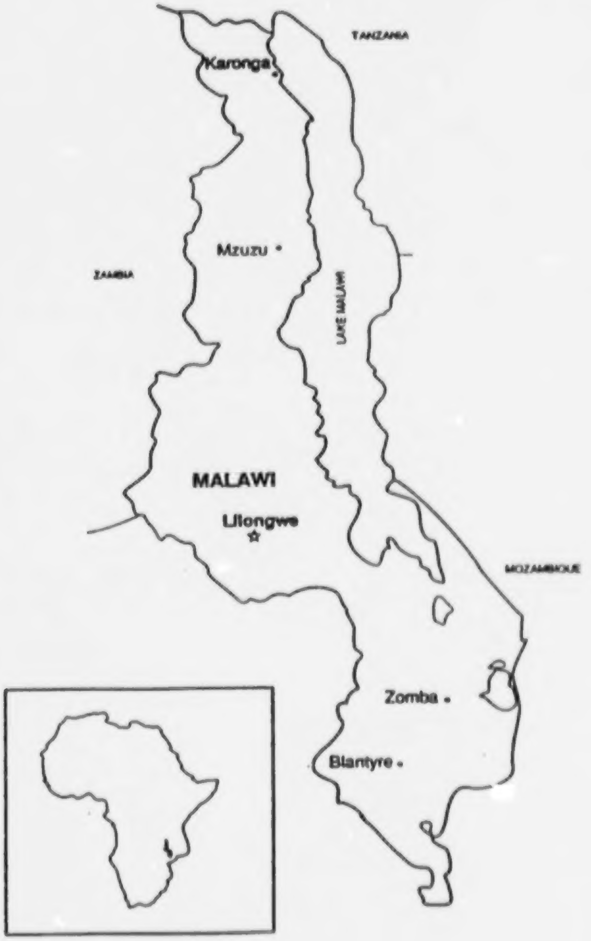
TANZANIA
Karonga
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ZAMBIA
LAKE MALAWI
MALAWI
Lilongwe
MOZAMBIQUE
Zomba
Blantyre

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INTRODUCTION

Malawi is a land-locked country located in southeastern Africa. It faces many of the same problems found throughout impoverished parts of Africa. Farming systems need improvement to increase crop yields to keep up with the growing population at a rate of 3% annually (Mukhoti, 1986). Vegetable varieties that grow well in nutrient depleted soils are needed (Sigman, 1992). Malawi Ministry of Agriculture (MMOA) has an extension system comprised of trained extension officers who are assigned to extension posts throughout the country (SECID/USDA, 1978). The extension service offers needed agricultural educational programs to farmers. However, many farmers, especially women, do not have access to these programs. For example, project leaders often overlook the female population during the needs assessment survey because surveyors generally interview those who raise cash crops such as tobacco or who have the land registered in their names, who are typically husbands (Spring, 1985; Weidemann, 1987). Since surveys are often used to determine the focus of a project, women's agricultural needs are often not being addressed. The tendency to focus on the male-headed household farm family may in part be due to a legacy from the colonial era (Vail, 1983).

Women in Malawi are the primary farmers. When information is offered by the extension service it must also reach women. The Malawi's Agricultural Research and Extension (MARE) Project was designed to develop an extension system that would extend information to women farmers that would provide assistance to maximize the development of the land they farm. During 1986-1992 the MARE project provided technical assistance through the Consortium for International Development in collaboration with Oregon State University, funded by U.S.A.I.D, at a cost of nineteen million dollars (US) (Acker et al, 1992). The objectives of this project were to increase the development of the capacity of the MMOA; to serve smallholder farmers in a better capacity for extension, research and training (Sigman et al, 1992). These goals led to furthering the MMOA's capacity to reach women who represent two-thirds of the smallholder farmers (Koopman, 1989). Since the mid '80's, especially in Africa, women are beginning to receive some attention in "development projects". USAID has created a regulation that each project provides documentation to demonstrate that the gender issue is addressed in each USAID funded project (USAID, 1987). This new policy combined with the theme of "the decade of the women" (1980-90) evolved due to the realization that women are the primary producers of crops.

Women of Malawi face a multitude of challenges as smallholder farmers. Not only is their access to extension limited but they are further restricted by the policies of Malawi that favor estate production. Government policies restrict crops that can be cultivated by smallholders as well as require that the crops be sold through the Agricultural Development Marketing Corporation (ADMARC) at fixed prices (Lele, 1990). The average farm size is 1.2 hectares (1980-81) and prices paid by ADMARC for goods are one-third to one-half below market prices. It is difficult for a women to feed her family and take care of the other needs of her children.

Over 1.2 million smallholder-farmers grow food that is consumed locally. Typically, maize and groundnuts are produced for local consumption, while tea, tobacco and sugar are primarily grown for export (Mukhoti et al., 1986). The present cooperative extension system is administered by the MMOA. The country is divided into eight geographical districts, each having an agricultural extension post (SECID, 1978). Due to the tradition and policies of the system, the estate farmers produce the export crops and are priority clientele of the extension service. Malawi is ranked the ninth poorest country in the world, which explains the tremendous demand for food production (World Bank, 1992). The country is greatly dependent upon the smallholder farmers to produce food for local consumption. The number of smallholder farmers that are women in Malawi, as in many parts of Africa, has increased and appropriate and agricultural extension information for women has recently been made available (Ariza-Nino, 1991; Spring, 1985).

Table 1. Gender division of crop production: Who decided to grow which crop.

Food Crop	% Food	% Sale	% Both	% Male	% Female	% Both
Maize	81	1	18	17	25	58
Beans	62	2	37	14	44	42
Cash Crop						
Tobacco	4	93	3	46	1	52
Cotton	0	48	0	40	6	53

Source: *Survey of Women in Agriculture in Malawi* p. 22.

Table 1 shows which gender decided to grow which crop; cash or food crop. The majority of food crops were selected by women while a majority of the men selected to grow cash crops. Thus to a great extent, women take the responsibility to grow food. In contrast, crops grown for export, such as tobacco and cotton, are primarily controlled by men. Consequently, development projects typically use this representation of a family as a model and women-headed households are not regarded. This perspective results in male farmers being the targeted audience for extension (Culler, Patterson and Matenje, 1990). Approximately 33 % of the households are headed by women and the number is increasing due to population increases and the lack of available employment near the home (NSO, 1984). The men tend to leave their families and go to the metropolitan or industrial areas, seeking wage labor. The women stay in the rural area and alone, care for their children and continue producing food for their families and to sell at the local markets (Spring, 1985).

Agricultural extension information that is available to women is crucial to improve food security in Malawi. Recently a program focused on women farmers was conducted in Malawi by U.S. Agency for International Development (USAID) and the Malawi Ministry of Agriculture (MMOA). Evaluating the effectiveness of the MARE Project is the focus of this paper.

PURPOSE OF THE PAPER

This paper is a philosophical analysis of the MARE project that recently was completed in Malawi targeting women smallholder farmers. The outcome of this project was synthesized to assess the extent that the extension service of Malawi has provided technical information and assistance to women smallholder farmers. Data from the MARE project will be referred to for analysis to demonstrate the project's successes and shortcomings. This paper focuses only on one component of the MARE project: the organization of agronomic, income-generating projects carried out by community-based Women's Groups.

REVIEW AND ANALYSIS

From 1986 to 1992 the MARE project provided technical assistance in Malawi through the Consortium for International Development in collaboration with Oregon State University, funded by USAID. The goals of the MARE project emphasized the need to further the MMOA's capacity to reach women; especially since they represent two-thirds of the smallholder farmers in Malawi (Koopman, 1989). The MARE project worked with extension personnel to provide women farmers accessible and appropriate technical advice and credit for income generating projects.

The objectives of the project were to 1) improve the Ministry of Agriculture institutional capacity, 2) increase the productivity of traditional crops and 3) identify the most viable crops to diversify smallholder production (Sigman et al, 1992b). The project managers anticipated the needs to meet these objectives by creating several MOA extension-based programs such as establish an institutionalized staff training program for the extension workers employed in the MOA, provide support for both applied research and adaptive research activities, and strengthen the extension system in research and information dissemination systems necessary to inform the farmers of agricultural recommendations (Cohen, 1985).

Women's Groups

The project provided guidance to the Women's Groups to manage income-generating activities, training in farm management skills and offered extension of credit to permit the purchase of materials for group-chosen, income-generating projects.

All women farmers had the opportunity to join a group in their community if they desired to use extension services offered by the project. Women's Groups were formed in each community under the guidance of a female director, hired by the MMOA. Woman directors coordinating the groups helped to break some barriers between the women of the community and the extension service. Each group was guided by a different director. Hence, the quality of guidance varied for each group depending on the directors' technical background and ability to coordinate a group. In some Women's Groups the director would advocate a project that was not favored by the members. This situation led to concerns regarding project feasibility and appropriateness for that particular Women's Group.

Measuring Success

The method of project selection raises the question evaluate how to measure the success of the Women's groups. One approach to measure the Women's Groups was to involve women farmers in extension related projects. Sigman (1992b) found that twice the number of women participated in "Pure Women's Groups" in comparison to mixed-groups (men and women).

Another approach is to ascertain what the women farmers perceived as their needs from extension, then analyze how effectively these goals were addressed by the MARE project. To evaluate the needs as perceived by women farmers, an extensive survey of women in agriculture was conducted by the MARE project (Culler, Patterson and Matenje, 1990).

Two questionnaires were designed; one for farmers and the other for extension staff. The questionnaire for farmers was quite lengthy, containing over 78 questions, many with multiple components. The questionnaire for extension staff was substantially shorter, 26 questions in total. The information was gathered using a well designed system, with a well-thought out statistical approach (Culler, Patterson and Matenje, 1990). This method provided means to include all types of farming families, thus reducing biases. In fact, the stratified, random cluster design used appears to be a useful model for information gathering when a baseline is being developed, for research and evaluation purposes.

What was particularly interesting was the extreme difference of focus of the two surveys: there were 73 "information gathering" questions (i.e. What crops do you grow?), five "perception of problems and solutions" related questions (i.e. What are your biggest time constraints?, What do you want from extension?) in the farmer survey. In contrast, there were 18 informational questions and 8 perception questions in the extension staff survey. On a percentage basis, 6.4% of the farmer survey included questions that allowed farmers' perceptions to be identified, and 30.8% of the questions of the extension staff questionnaire elicited staff perceptions of problems and solutions. This points out that the survey was not targeting farmers' views of their problems/constraints and solutions but was aimed at gathering general production information. In addition, the survey was not useful for identification of what farmers wanted from extension; critical information to identify needs of farmers that needed to be addressed by the extension service.

Both, the farmer and extension surveys, were effective at gathering "base-line" information: finding out information about what farmers were growing, time constraints, income sources, etc. The focus, thus, was on what the researchers could surmise about women farmers from the baseline information gathered and on what extension staff believed were the problems women farmers faced. While very useful baseline information was collected about women and their families in rural Malawi, it seems that their problems were mostly identified by the "experts", the coordinators of the MARE project, with some input from Malawi extension staff, not from the farmers. It is well documented that involving the farmers or project clients is an essential component of a project in order for it to be sustainable (Weidemann, 1987).

Project Weaknesses

As the project unfolded, the coordinators of the project identified the following weaknesses: 1) the directors often began the project with no effective group organization training, 2) some of the directors lacked a thorough understanding of the technical components of the project, and 3) some directors lacked the skills necessary to assess project feasibility. In the final year of the project this situation was improved by instituting an annual training workshop for the directors of the Women's Groups as well as leaders in technical areas such as agro-forestry and agronomy. The training curriculum provided directors the techniques to effectively work with groups and assessment of project feasibility. MARE coordinators concluded that a future priority should be to increase funding for visitation by directors to the Women's Groups. It was also determined that a missing component was intensive training of directors before the Women's Groups were formed to assure the initial steps of group formation were successful (Coffman et al, 1989).

As the MARE project progressed, the coordinators focused on group direction training as the major area needing improvement. This important component determines if an income-generating project will be successful. However, one consultancy report concluded that income-generating projects imposed by group leaders were often less successful than those initiated by the women in the group themselves (Dontoh-Russell, 1988). This suggests that training in group decision making and project feasibility assessment may be useful for group directors. Even though, overall, the groups were successful (Acker et al, 1992), two important lessons from those that were less effective can be drawn. First, initial training is important for group leaders; and second, community-identified and carefully assessed projects have a greater chance of succeeding.

EDUCATIONAL IMPORTANCE

There were many positive aspects of the MARE project. The MARE project created a realization by many people in the community, especially men, that women can use technical information in a productive and profitable way (Matenje, personal communication). Success was also indicated by the number of Women's Groups that are perusing more advanced projects that require a greater financial and technical investment such as reinvesting the money earned from a small-scale project to purchase and train bullocks for animal traction. Formation of the Women's Groups reached approximately two times the amount of small holder farmers than by traditional means (Sigman et al, 1992). The women who became established in the community-based groups gained confidence in their agricultural abilities by working with other smallholder farmers who were also women with similar needs Thus, a strong network was formed to empower each other, creating new economic opportunities and strength in the community of smallholder farmers in Malawi.

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Nonformal Education for Empowerment:

The Case of the Learning Groups in Lembang, Indonesia

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Introduction

"One of the most important functions, if not the most important function, of nonformal education is to empower the powerless -- help them individually and collectively, to become the principal determinant of their own lives" (Etling, 1975).

Empowering learners to take their destiny into their own hands has not been easy to achieve in nonformal education especially in international situations. The most common problem with programs initiated and carried out by external agents is that most of these programs cease to function after the agents leave. The top-down approach is notoriously ineffective and has led to the loss of millions of dollars. Successful programs cannot be imposed upon communities but should arise from local needs and concerns. Participation of the community in planning, implementation and evaluation of development projects is the key to success (Kitinoja & Miller, 1992). The Lembang project was a successful attempt to create a sustainable project--one which involved the community in planning and implementation and which continued after the external agents had left.

Project Overview

From 1973 to 1975, the Indonesian Directorate for Community Education (PENMAS), in collaboration with World Education Inc. (New York), embarked on a project to develop an effective village level approach for family life planning and vocational education. The project involved five sites in Indonesia with a team of consultants on each site. A variety of activities were conducted at the different sites including construction of a learning center and the development of skills in food preservation, sewing, bamboo carving, and weaving. Lembang was one of the sites for the project.

In Lembang, the program consisted of radio broadcasts on family planning for listening groups. The villagers would meet once a week to listen to a radio broadcast and then have a follow up discussion on the topic they had heard. The learning groups were made up of mostly unemployed high school dropouts, between the ages of 18 and 23 selected by the village leaders.

During the second year of the project, the villagers of Lembang assumed responsibility for what they were taught and how they learned the material (Kindervatter, 1979). Through the efforts of the team of consultants, the facilitators, and the learners, the program developed into an empowering experience for the learners.

A review conducted at a materials development workshop prompted the team to adopt a learner-centered approach to their educational programs. In adopting this approach the team decided to use the process and the content of the program to empower the local people. They emphasized participation and control by the groups and used the immediate needs of the groups as the basis for writing the scripts for the radio programs.

The objectives for the learner-centered programs were to:

- enable the participants to understand their problems, define them clearly, and develop alternative solutions;
- enable the participants to take part in learning activities that involve exchanges of information and experiences through discussion and the utilization of relevant materials and local learning resources;
- enable the participants to increase their individual capabilities on their own, not only in the course of group discussion/activities;
- enable the participants to improve existing skills or develop new ones so that they can be more productive;
- promote harmonious relationships between the people and the learners; and
- enable the participants to organize themselves into groups for their own progress (Setti, 1975, in Kindervatter, p.167).

To achieve these objectives, the team allowed the participants to control their programs while it facilitated their acquisition of the skills needed to carry them out. Dr. Kindervatter was a materials development consultant on the Lembang project in 1975 and also assisted with the evaluation of the project in the same year.

Purpose

This paper reviews and analyzes the methods adopted by the team of consultants for the Lembang learning groups project in order to determine how the process empowered the participants. It is appropriate to review this project because it has useful implications for international extension education. By examining this model, the authors will demonstrate the empowering process in nonformal education.

Philosophical Issues and Methodology

The paper addresses two important issues: 1) What are the characteristics of nonformal education for empowerment? 2) How does the Lembang project fit Kindervatter's model for empowerment? Two instruments, checklists of questions from Etling (1992) and Kindervatter (1979), will be employed to analyze the Lembang project.

Etling's (1992) checklist of ten categories of questions (figure 1) helps analyze the nature of (1) the learners, (2) the educators, (3) their interactions with each other, (4) resources needed, (5) educational content, (6) educational purpose, (7) control of the educational process, (8) evaluation process and results, (9) problems with the model, and (10) unique features of the educational model being analyzed.

Kindervatter (pp. 153-154) outlines eight characteristics of nonformal education for empowerment -- Small group structure; transfer of responsibility; participant leadership; agent as facilitator; democratic and non-hierarchical relationships and processes; integration of reflection and action; methods which encourage self reliance; improvement of social, economic, and/or political standing.

To determine how the Lembang project fits Kindervatter's model for empowerment the following questions were posed: Did facilitators use a small group structure? Was responsibility transferred to the learners? Did the participants exercise control over what was taught and how programs were organized? Did the outside agents act as facilitators? Were the relationships between the team members and the villagers hierarchical or horizontal? Did the project allow participants to reflect and act? Did the methods used encourage self reliance? Did the project improve the social, economic, and/or political standing of the villagers? By examining these issues and answering these questions the authors will be able to determine if the learning groups project empowered the villagers of Lembang and why empowerment occurred.

Analysis of the Model Using Etling's Checklist

The learners – The learning groups were made up of mostly unemployed primary or junior high school dropouts between the ages of 18 and 23. They were selected by the village leaders, local authorities, and the neighborhood association. The 94 participants were placed in groups of nine

Figure 1. Ten Criteria to Analyze Educational Models

1. The Learners

Who are the learners? What are their characteristics? Can we learn anything by asking about their gender, age, ethnic or socio-economic groups represented? How were they chosen? Is participation voluntary? How long do they stay in the program? How long **should** they stay in the program? Are the learners active or passive? How large are learning groups? Small groups allow for more individual attention. Large groups are often desired for financial reasons. Ideally, some balance will be struck between learning effectiveness and cost effectiveness.

2. The Educators

Who are the educators? Can we learn anything by examining their gender, age, ethnic or socio-economic groups? What are their qualifications? What is their competence? How were they prepared to be educators? What is their motivation to be educators? How long do they stay in their positions; in the profession? Do they tend to get hired away from education by other employers? Do their professional organizations or unions help or hinder their educational effectiveness? What incentives would make them more effective educators?

3. Interactions

How do learners and educators interact? Who is responsible for the motivation and the discipline necessary for learning to occur? Are students encouraged to learn from each other? Do educators consciously learn from the learners? Who sets the learning objectives? Are these objectives allowed to change as a result of the interactions? What learning styles are encouraged? What do learners learn about the learning process?

4. Resources Needed

What resources (facilities, materials, equipment, books, salaries, time, volunteers) are needed for effective learning? Are these resources local or imported? Are they expensive? What could be done to cut costs or expand resources without sacrificing learning effectiveness? Where does the learning take place? Can learners use resources flexibly? Can the educational tools be shared, adapted, and changed according to individual learners' needs? A textbook is relatively inflexible. A simulation game with a minimum of rules and instructions, on the other hand, can be shared, adapted and changed endlessly.

5. Content

What skills, knowledge, and attitudes are taught and learned? What is the **intended** content and what are the **unintended** skills, knowledge and attitudes that are taught or learned? Who designs the curriculum? Can the educators and learners change the content? Is the curriculum sequential or cafeteria style? Sequential curricula means the content is taught/learned in a sequence where current learning depends on past learning.

Figure 1. Ten Criteria to Analyze Educational Models (Continued)

Cafeteria curricula mean that several options are provided and the educators and learners are allowed to sample as much or little of as many or few of the available options. In some or learning that will not be used for months or even years ("you're going to need this when you get to college")? Is the curriculum self-generating? Will it allow the learners to add their own improvements and pass them on to other learners? Does the learning create dependence (on the teacher or the institution) or independence for the learner?

6. Purpose

What are the primary and secondary purposes of the educational model? Is it supposed to develop competent carpenters or teachers of vocational agriculture? The purpose of most primary schools is for students to learn reading, writing and math in order to be better citizens and more fulfilled individuals. However, some critics argue that the secondary purposes of primary schools are (1) employment of teachers, (2) babysitting kids, (3) socialization of young people, and (4) certification. Sometimes the secondary purposes push aside the primary purpose. Paulo Freire argues that the purpose of education should be "conscientization," a process whereby learners (1) become **conscious** of the world around them, (2) develop a **conscience**, a feeling of responsibility toward that world, and (3) develop a **commitment** to transform the world into something more desirable. Critics argue that conscientization is a political process that leads to socially unacceptable ends.

7. Control

Who has control of the educational model? Is it the people who participate in the model or bureaucrats hundreds of miles away who are more concerned with their own jobs than the fate of the learners? Who pays for the maintenance of the model? Who makes policies? Who sets the limits on participation? Who are the stakeholders (those groups who will benefit from the model's successes or suffer from its deficiencies)? Are all stakeholder groups involved in the control of the model?

8. Evaluation

How is the model's effectiveness determined? Who conducts the evaluation? What methods and techniques are used? What are the results? To whom are the evaluation results directed? What are the strengths and weaknesses of the model? What benefits accrue to the beneficiaries?

9. Problems

What can be done about the problems that limit the model's effectiveness? Are the problems internal to the model or external? Can creative problem-solving be used to resolve the problems? Can the problems be eliminated, neutralized or endured? What amount of resources can be allocated to the problem without endangering the model?

10. Unique Features

Many educational models have unique features that simply do not get analyzed if the first nine categories are used. Many models are maintained by particularly charismatic leaders which provide strength to the model. If a model depends too heavily on such a person, however, it is vulnerable. Therefore, questions should be raised about the model's unique features. What are they? Are they strengths or weaknesses? What, if anything, should be done about the unique features of the model?

consisting of males and females with the exception of a few all male groups. Grouping by age and socio/economic background was based on the assumption that it will promote participant involvement and learning. Learners actively participated in planning and implementing the program.

The educators -- Educators were recruited from among the village youth and also teacher training students on teaching practice. To qualify, an educator had to be currently employed, have a high school education, be at least 25 years old, and possess experience and a strong interest in and a dedication to community work. Educators were trained in discussion techniques, how to function as a facilitator and how to develop active learning situations.

Interactions -- Learning occurred in an atmosphere of free exchange of ideas among the learners, facilitators, and the team members. The needs of the learners were continuously assessed by the team to ensure that they were being met. For instance the original format for the radio broadcast was changed to suit the learners' needs. Groups were given a lot of freedom to decide what they wanted to learn and how they wanted to learn the material. They also generated more activities from the existing programs based on needs that arose. Both learners and facilitators acquired skills that they could use themselves to produce programs without the team members.

Resources needed -- Radio broadcasts, scripts, and visual aids were initially produced by the team members but over the course of the program the facilitators and learners were taught to produce the materials themselves. All the parties had inputs into the production of the weekly bulletin also. Materials were readily available and inexpensive because they were produced locally and were also based on the needs of the learners. Learning took place mostly in the learners' homes.

Content -- The groups learned a large variety of skills including craft making, automobile maintenance, and food preservation as well as problem solving and organizing skills. The curriculum was not required and was not sequential. Learners generated their own topics based on issues arising from the radio broadcast and what they felt would be immediately useful to them. They also acquired knowledge about issues affecting the community through the radio program and the bulletin but the most important was the sense of control and the take charge attitude. Learners controlled their program with little dependence on the facilitators.

Purpose -- The purpose of the project was conscientization as well as skills development. The learners were taught problem solving skills and through the guidance of the team and facilitators, they learned to identify problems and find solutions. They also became more aware of what was happening in their community and initiated several community projects to improve the quality of life within it. Various practical skills were acquired during the project.

Control -- The project was initiated and funded by PENMAS and World Education, Inc., and therefore these organizations had the ultimate control but the villagers had a lot of control over the direction of the project as far as their needs were concerned.

Evaluation -- The team members conducted formative evaluation by observation, interviews and feedback from the facilitators in order to revise and improve the project. There was no formal summative evaluation but a look at the project two years after the team had left showed that all the original groups were still around and four new ones had been formed with the help of the original groups. Benefits accruing to the villagers of Lembang included self confidence, the idea that they can organize to solve their own problems, and the acquisition of professional skills for economic survival.

Problems -- Some of the radio scripts produced by the facilitators were of poor quality and the learners found them boring since they were accustomed to professionally produced programs. However, producing the radio programs was also part of the learning process. It was not easy to recruit facilitators because people were not familiar with the program so the team sought the assistance of the local authorities to help explain the program to potential resource persons. There was not enough money to support all the activities planned by the groups and both the groups and the team had to seek additional sources of funds. Some of the facilitators continued to teach instead of facilitating. Some parents were not willing to let their daughters attend night classes and so the group provided permission slips for the parents to sign. Some of the least educated participants were reluctant to participate in discussions unless they were called upon to speak.

Unique features -- The Lembang team had had some experience with different kinds of approaches and were therefore familiar with non traditional methods of teaching. The team was willing to stand back and let the villagers assume a major role in decision making. The project was community based. Facilitators and materials were obtained from the community and village leaders were involved in selecting the participants and facilitators. The learning groups undertook activities that benefited the whole community. The team made excellent use of the learning process to empower the villagers. The learners were of the same socio-economic level and communication was encouraged between them through weekly meetings. The radio served as a good stimulus around which to organize the villagers for action.

Analysis of the Model Using Kindervatter's Checklist

Group Size -- Even though no actual limits were set on group size, a maximum of 15 participants per group was suggested by the team to facilitate discussions. Generally they had about ten participants in a group.

Transfer of Responsibility -- A conscious attempt was made by the team to increase the involvement of the local people and decrease its direct involvement in the project over a five month period. Initially the team was responsible for producing the radio broadcast and visual materials but the (locally selected) facilitators were trained to produce many of the episodes for the broadcasts as well as the learning materials. Learners also became very active in producing the materials. Responsibility was transferred first to the trained facilitators and then to the learners.

Participant Leadership -- Learners were given the opportunity to discuss whatever they wished and take appropriate actions themselves after each radio broadcast, then pursue activities based on their interests. Programs were generated according to the needs of the learners and what was learned was immediately useful to them. The needs of the learners were constantly assessed through discussion between the learners and facilitators who communicated the information to the team at their monthly meetings. Team members also evaluated the programs through observations and interviews during site visits. Many of the programs and activities were generated through the initiative of the learners themselves. Thus ownership and control of the project was given to the local people.

Agent's Role -- The team members served as resource persons and catalysts for the facilitators and the learners. They trained the facilitators, took care of administrative and budget matters, coordinated the production of the bulletin, held monthly meetings with the facilitators, and provided assistance upon request. The facilitators produced educational materials and radio programs, and also led discussions. The learners decided what they wanted to learn and took an active part in planning and implementing programs that would satisfy their needs.

Relationships -- The relationships were more horizontal than hierarchical. The team regarded the various parties in the program as equal partners with each group playing an active part in planning, decision making, and implementation of programs.

Reflection and Action -- The groups identified problems and opportunities through learning and discussion and, with the help of the facilitators, analyzed and understood the situation and took action based on their assessment. For example, group members of a bamboo carving class developed a strategy to use their skills to generate some income, and strategized on how to approach the bank for a loan (Kindervatter, p. 174). Even though they were unsuccessful in acquiring the loan, they learned about problem solving and how to work as a group.

Self Reliance -- Through the program the groups developed skills like problem solving, how to work in a group, and how to interact with authorities. These skills would enable them to be self reliant. For instance, when a doctor did not show up for a talk with one of the groups, the group found out what was happening and arranged for a substitute instead of going without the talk. The groups were given a lot of freedom to decide what they wanted to learn and how they wanted to learn the material. They also generated more activities from the existing programs based on needs that arose. Both learners and facilitators acquired skills that they could use themselves to produce programs without the team members. Through the skills exchange in the bulletin the participants matched people who had skills to share and groups who needed to learn certain skills.

Status Improvement -- The groups learned a large variety of skills including craft making, carving, automobile maintenance, and food preservation. They also acquired knowledge about issues affecting the community through the radio program and the bulletin. The most important attitudes were the sense of control and the "take charge" attitude. Through the activities of the groups members initiated community programs and felt a sense of achievement as a result. These skills would help them to improve their economic as well as their social status. They became more involved in community development activities.

Results/Conclusion

The team succeeded in creating a nonformal education program that helped to empower the villagers of Lembang within the framework outlined by Kindervatter. The consultants on the Lembang nonformal education project sought to create a learner centered program and to enable the villagers to take control of the program to help themselves. This was achieved by the participants' active involvement not only in planning and implementing learning programs for themselves but also from their involvement in activities within the wider community.

Even though no formal evaluations were conducted, available evidence shows that the Lembang learning groups project was successful in empowering the villagers of Lembang in terms of helping them to take charge of the project and use it for their benefit. Two years after the program ended, the original learning groups were still operating and four new ones had been started. The facilitators for the new groups were trained by the facilitators of the original groups. The Lembang project also influenced the direction of nonformal education in the whole country. The new educational approach in the five year plan (1977-1982) drew heavily on the Lembang experience (Kindervatter, p.180).

Strengths of the program include: (1) willingness of the staff to share power, (2) a community base, (3) homogeneity in age and schooling, (4) availability of the radio as a stimulus for community organization, (5) creation of a supportive environment for facilitators to share information and discuss problems, and (6) availability of learning materials.

One constraint on the model was its heavy dependence on commitment from both staff and the villagers. Programs were not always of high quality. For example, learners found some of the radio programs boring because the quality was not as high as the more professionally produced programs they were used to. This was, however, offset by the experience that villagers got from being active participants in their own programs.

Educational importance

Empowering the powerless and helping them take charge of their own destiny is an essential part of nonformal education. In most nonformal education programs, especially in developing countries, the ability to empower is crucial to the success of the program. It is especially useful in international settings where consultants leave the site and the country after specific projects.

The Lembang program is a useful example of how nonformal education can be an empowerment process. The villagers of Lembang participated in planning and implementing the program. In the process they acquired skills that they could use after the team members were gone. They were able to generate programs that satisfied their immediate needs. While this model may not fit all situations in nonformal education, it is a useful contribution to the process of empowerment in nonformal education. It can be applied successfully to situations similar to that of Lembang.

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FACTORS INFLUENCING RURAL WOMEN CASSAVA PROCESSORS' INTENDED PARTICIPATION IN AN AGRICULTURAL EXTENSION EDUCATION PROGRAM

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FACTORS INFLUENCING RURAL WOMEN CASSAVA PROCESSORS' INTENDED PARTICIPATION IN AN AGRICULTURAL EXTENSION EDUCATION PROGRAM

Introduction

Women provide most of the labor and make the key decisions for many agricultural activities such as cash cropping, animal husbandry, marketing, and food processing in Africa (Saito & Weidemann, 1990). The World Bank (1989) reported that women were responsible for at least 70% of the staple food production in Africa. Women have the sole responsibility for planting and harvesting crops such as yams, coco-yam, vegetables and cassava (Manihot esculenta).

Cock (1985) found that cassava was grown and processed mainly by small rural women farmers with labor-intensive methods. Cassava is one of the most important staple food crops grown in tropical Africa. Cassava represents the primary root crop of the Nigerian rural women farmers and accounts for over 50% of the carbohydrate intake when processed into various foods (Adjebeng-Asem, 1990; Food and Agricultural Organization, 1984, 1989).

Rural women cassava processors are ignored, not recognized or reflected in agricultural and Extension education programs and are seen as reproducers rather than producers by administrators and policy makers (Uphoff, Cohen, and Goldsmith, 1979). Yet, women are important elements in agricultural development because they play a significant role in economic and social activities.

Several factors appear to have limited women's efforts to participate and increase agricultural production and hence improve rural development. For example, competing demands for their time, intensive labor requirements and inadequate technologies have not been seriously addressed by research and development programs (Food and Agricultural Organization, 1984). The lack of participation of rural women cassava processors in agricultural Extension education programs also may have contributed to a serious lack of exchange of technology for women farmers. Exchange of technology greatly increases labor efficiency and productivity, raises incomes and standards of living for cassava farmers, and helps the urban poor (Eggleston, et al, 1989).

Miller (1990) identified four factors related to participation in a community development educational program. These factors included:

(a) demographics and environmental factors,
(b) felt needs,
(c) action orientation, and
(d) motivators.

Kitinoja and Miller (1991) developed an assessment technique called "readiness assessment" which goes beyond the common needs assessment by including components related to action orientation, motivations and constraints. According to the authors, "the assessment technique determines not only whether there is a felt need for a program, but whether factors such as attitude toward change, ownership of the problem, confidence level, external factors, or perceived benefits/costs are present and act in favor or against readiness for participation in a given Extension education program" (p. 2).

Lewin (1947) indicated that an individual's participation in education activities is dependent upon personal need within the context of positive and negative external forces affecting the individual. Rogers (1983) and Love (1985) identified felt need as a pre-requisite for learning. The situational characteristics under which learning takes place and personal characteristics such as physical, socio-cultural and psychological characteristics have been described as essential to an individual's readiness to learn (Cross, 1981). Factors related to individual readiness to learn cited by Cross (1979) were age, educational level, region of residence, and proximity to the learning activity. Rothman (1974) and Klevins (1978) identified income as influencing adult readiness to learn. Long (1967) listed distance sponsors, method and topic as important for the participation of officials in the educational activities.

Very little has been written about why rural women cassava processors decide to participate or not in agricultural development programs. If the economic and social conditions of rural women farmers are to be improved, Extension education programs need to be offered at the grassroots level. However, a lack of participation by rural women cassava processors in these educational programs is problematic. It is unclear what factors lead to intended participation in Extension education programs on cassava processing for rural women processors.

Purpose

The main purpose of this descriptive and correlational study was to identify factors influencing rural women cassava processors' perceived intention to participate in an agricultural Extension education program on cassava processing. The following research objectives were developed to guide the study:

1. To identify the demographic characteristics of rural women cassava processors (i.e., age, years of schooling, income status, martial status, farming status, years processed cassava, dependent children, years in farming, size of cassava farm, processing location and market location).
2. To identify the factors contributing to the readiness of rural women cassava processors to participate in an agricultural Extension education program on cassava processing.
3. To determine the proportion of rural women cassava processors who intend to participate in an agricultural Extension education program on cassava processing.
4. To examine the relationship between selected demographic characteristics of rural women cassava processors and their readiness and intention to participate in an agricultural Extension education program on cassava processing.
5. To determine the proportion of rural women cassava processors who can be correctly classified as intending to participate in an agricultural Extension education program on cassava processing.

Methodology

The target population for this study were rural women cassava processors in Zone III of Ondo State, Nigeria. The sample consisted of 224 individuals who were purposively selected from areas with large concentrations of rural women cassava processors in that zone.

An interview guide was selected as the measurement instrument. The interview guide consisted of two parts. The first part measured the readiness factors of the rural women cassava processors and their intention to participate in an agricultural Extension education program. The second part gathered demographic information about the cassava processors. A panel of experts assessed the interview guide for content and face validity. The internal consistency of Part I of the instrument, using a Cronbach's alpha coefficient, was .81.

Data were collected through the use of face-to-face interviews. Descriptive statistics, factor analysis, and discriminant analysis were used to analyze the data.

Results and Conclusions

This section summarizes the major findings of the study. These findings are presented in order of the objectives and include: demographic characteristics, readiness factors, intention to participate in agricultural Extension education programs, relationship of individual characteristics with intention to participate, and proportion of rural women cassava processors who could be correctly classified.

Demographic Characteristics

The mean age of the rural women cassava processors was 41. The youngest respondent was 16 years of age and the oldest was 75 years of age. The mean length of time they had attended school was 4.1 years, with the maximum being 16 years and the minimum being 0 years. Their average annual cassava processing income was 3772.0 (Nigerian naira). The mean years of processing cassava experience was 13.1. However, their experience ranged from 1 to 40 years. The mean number of children that these rural women had was 4.7. They had farmed for an average of 17.7 years and had an average of 2.2 hectares of cassava. The mean distance to the cassava processing location was 4.0 kilometers. The mean distance to the nearest cassava market was 7.2 kilometers.

The major source of income for 93.3% of these rural women cassava processors was from farming. Married rural women processors represented 89% of the processors' population. A total of 61.2% of the respondents reported petty trading as their largest source of other income. The vast majority (87.1%) of the rural women processors processed their cassava at home.

Readiness Factors

In conducting this study, the researcher assumed that each measured characteristic item could be decomposed into: 1) common and 2) unique positions. Therefore, a maximum likelihood (common factors) factor analysis was conducted. This approach was recommended by Ford, MacCallum, and Tait (1986) when the measured variable (items) are assumed to be a linear function of unmeasured (latent) characteristics. Since a sample of rural women cassava processors was studied rather than a population, the researcher further concluded that the maximum likelihood factor analysis was appropriate.

Two guidelines were selected for use in determining the number of factors to include in the analysis. First, only factors with eigen values greater than 1.0 were considered. Second, a scree plot of the eigen values was used to identify breaks or discontinuity in the factors. These two guidelines resulted in the identification of six factors underlying the rural women processors' readiness to participate in agricultural Extension education programs.

Based on the analysis described above, a second maximum likelihood factor model analysis was conducted using only the six factors identified above. Ford et al. (1986) indicated that if the factors are not thought to be orthoginal, they should be rotated using an oblique process.

An examination of items in the factor loading pattern matrix was used to understand the nature of the six factors. These factor loadings indicated the correlation between each item and the derived factors. Only items with factor loadings of .4 or higher were considered for labeling the factors. The factors were labeled by a panel of African graduate students as felt need, cooperation, sharing information, awareness, attitude toward innovation, and empowerment. The six factors accounted for approximately 40.3% of the variance in the rural women cassava processors' readiness to participate in an agricultural Extension education program. The interfactor correlations for the oblique rotated factors indicated low to negligible associations (Davis, 1971) ranging from .21 to .01, between factors. Therefore, these factors appear to be relatively independent in explaining the rural women processors' readiness to participate in agricultural Extension education programs.

Intention to Participate in Agricultural Extension Education Programs

The rural women cassava processors were asked to indicate their level of agreement or disagreement with a statement indicating their intention to participate in an agricultural Extension education program on cassava processing. Since the statement on the interview guide was stated negatively, it was restated positively for the analysis and the responses were recoded as follows: 1=4, 2=3, 3=2, and 4=1. A score of one or two indicated the processors did not intend to participate in an agricultural Extension education program; a score of three or four indicated the processors did intend to participate.

Two hundred (89.3%) of the respondents either strongly agreed or agreed with the statement. Twenty-four (10.7%) of the respondents disagreed or strongly disagreed. These findings indicated that a large majority of the respondents intended to participate in an agricultural Extension education program on cassava processing.

Relationship of Individual Characteristics with Intention to Participate

A discriminant analysis procedure was used to determine if a linear combination of the independent characteristics could be used to distinguish between those rural women who indicated they would participate and those who would not participate in an agricultural Extension education program on cassava processing. The independent characteristics included the six readiness factors identified by the factor analysis reported earlier and the demographic characteristics.

The pooled within groups correlation coefficients were examined to determine the relationship between characteristics and group. The scale suggested by Davis (1971) was used to describe the magnitude of the relationships between the discriminating characteristics.

The pooled within groups correlation matrix showed negligible to very strong relationships among the discriminating characteristics. The correlation coefficient for years rural women have been processing cassava and years rural women have been farming indicated a very strong positive relationship (.83). Factor score 3 (sharing of information) and factor score 6 (empowerment) indicated a positive substantial relationship between sharing information among rural women processors and empowerment (.59). A negative substantial relationship existed between awareness of extension education programs on cassava processing and size of cassava farm (-.53). Also, a positive substantial relationship existed between years of processing cassava and processors age (.58) as well as a positive substantial relationship between years of farming and processors' age (.63).

A moderate negative relationship occurred between annual cassava processing income and factor score 1--felt need--(-.33) and factor score 2--cooperation--(-.33). Moderate positive and negative relationships were found between factor 3--sharing information among processors--and marital status (.37) and sharing information with years of farming (-.43). Also, factor score 4--awareness--and other sources of income had a positive moderate relationship (.45). A negative moderate relationship occurred between factor score 4--awareness--and distance to nearest market (-.39). Also, there was a negatively moderate correlation between factor 6--empowerment--and years of school (-.35).

Moderate positive relationships were found between age of processors and major source of income (.30), number of children (.44), and distance to nearest processing location (.40). Likewise, annual cassava processing income had a positive moderate relationship to years processing cassava (.31), distance to cassava processing location (.30), and number of children (.30). A negative moderate relationship was found between rural women's marital status and years processing cassava (-.36). Additionally, other sources of income had a negative and moderate relationship with distance to nearest market (-.33).

A positive moderate relationship was found between the best time of the day for processors to work with Extension workers and years processors have been processing cassava (.32). Positive moderate relationships were also found between years processing cassava and number of children (.36) and between years processing cassava and distance to the nearest cassava processing location (.41). The data indicated that there were positive moderate relationships between number of children and years of farming (.43), number of children and size of farm (.38), and number of children and distance to the nearest cassava processing location (.41). A negative moderate relationships was observed between the number of children and the distance to the nearest market (-.30). Positive moderate relationships were found between years of farming and size of cassava farm (.30) and distance from processors' farm to the nearest processing location (.44). Finally, there was a positive moderate relationship between total size of cassava farm and the distance to the nearest cassava processing location (.40).

Warmbrod (1993) indicated that only standardized structure coefficients whose absolute values are not less than one-half the largest value should be considered. Therefore, only structure coefficients greater than .36 were considered meaningful.

From an examination of the standardized discriminant function coefficients, it was concluded that the most highly distinguishing (discriminating) attributes of those rural women processors who do not intend to participate had higher scores on attitude toward innovation and were married. Those rural women cassava processors who intended to participate had higher scores on felt need, cooperation, sharing information, had farmed for longer periods of time, and preferred evening meetings with the Extension workers.

The significance test indicated that the two scores (centroids) were significantly different ($p<.002$). The null hypothesis, that in the population from which the sample was drawn the mean discriminant centroids were equal, was rejected. The group centroids differed significantly on the discriminant function. This decision was based on the Wilks' lambda. The significance of Wilks' lambda was tested by converting it to a characteristic that had approximately a chi-square test ($p<.001$) and the alpha level was less than .05.

The discriminant function explained approximately 44% ($R_c=.666$) of the variance in the discriminant score. The proportion of variance not explained in the discriminant function was about 56% (Wilks' lambda). The eigen value was .80, which indicated that this function explained .80 times more than was not being explained.

Proportion of Rural Women Cassava Processors Who Could Be Correctly Classified

Approximately 91% of the cases were correctly classified by the discriminant analysis procedure. A total of 94% of the rural women processors who intend to participate and 67% of the rural women processors who do not intend to participate were correctly classified. The tau statistic indicated that the classifications based on the discriminating characteristics resulted in 81% fewer errors than would be expected by random classification or by chance alone

The following conclusions were drawn based on the results of the study:

1. Six factors were identified as influencing the readiness of the rural women cassava processors to participate in an agricultural Extension education program on cassava processing: felt need, cooperation, sharing information, awareness, attitude towards innovation, and empowerment.

2. The rural women cassava processors were educationally and economically disadvantaged.

3. The rural women cassava processors had considerable experience and indigenous knowledge about cassava processing.

4. The rural women cassava processors faced transportation problems in getting the cassava from their homes to the market.

Educational Importance

The lack of rural women cassava processors' participation in agricultural Extension education programs on cassava processing is likely to negate Nigeria's success in accomplishing its major goal of food sufficiency. Currently the nation's farm productivity is declining, creating shortages of food at the market and raising prices of the cassava product (gari) beyond the reach of the poor. Therefore, information regarding the factors that influence rural women cassava processors to participate in agricultural Extension education programs should be used to help Nigeria become more economically stable and viable.

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Title: "There is always another mat to weave":
Invisible Women Farmers in Western Samoa

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"There is always another mat to weave": Invisible Women Farmers in Western Samoa

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Introduction

In 1992 I was involved in the design of a farming systems project in Western Samoa, as the Extension Specialist/Women in Development (WID) Adviser (Beilin, 1992). The farming systems project is part of the Australian Government's bi-lateral aid program with the Government of Western Samoa.

The WID interest was not shared by the Department of Agriculture. Women's lives were the official concern of the Women's Affairs Department. The Department of Agriculture maintained that "our ladies do not work in agriculture". Women's Affairs clearly thought differently, and cited a cooperative project between the Department of Agriculture, Women's Affairs and UNICEF (1991-92), in which horticultural seed was being distributed to women's groups.

The Seventh Development Plan--DP7 1992-1994 (1992) for Western Samoa advocates "sustainable development", reaffirms the importance of the village as the centre of Samoan life, desires increased economic opportunity in rural areas, with improved access to such opportunities by the population, and a desire to increase self-reliance through less vulnerability to disasters like cyclones (p.34). Further, the DP7 declares the intention of more actively involving "rural communities in agricultural planning" and to "attempt to achieve more meaningful community involvement" (p.70). The Department of Agriculture is then expected to act on these broad policy objectives.

Agriculture and its related activities support about 75% of the total population of Western Samoa. Agriculture centres around village life, with labour supplied by extended family units and production is for both commercial and subsistence economies. Slightly more than 80% of West Samoan land is held under customary tenure. These lands are controlled by the *fono* (village council) consisting of the titled chiefs of families. These lands cannot be sold or leased without the *fono* approval (Fairbairn, 1993), though of late there is an increase in inter-family inheritance.

The farming systems approach was relatively new to the Department of Agriculture and their extension service. Historically the Western Samoan extension service had evolved in partnership with the mainly foreign funded agricultural development schemes. As these 'aid' schemes were usually projects with a finite timeline, the extension service had become a somewhat low-key campaign office, using largely a diffusion:adoption methodology. In 1984, The Asian Development Bank introduced the Training and Visit System (A'oa'o ma Asiasi) to the Department of Agriculture. In 1989, the Government of Western Samoa requested FAO review the T and V system, which had been suspended in 1988 (Foo, 1989). In 1992, the extension service had implemented only parts of the 1989 review recommendations and a modified form of T and V was the accepted method of operation within the department.

Given this brief history, it is not difficult to imagine the low level of morale and underlying suspicion with which the extension staff faced yet another bilateral aid project. The project was partly in response to the DP7 as well as to the devastation Samoans suffered as a consequence of the cyclones Ofa and Val, which had wreaked havoc in the previous eighteen months. Though as farmers Samoans are accustomed to difficult weather patterns, the second cyclone was unusual in following so closely that of Ofa, and consequently all the usual reserves of stocks and seeds, which had been planted to compensate for Ofa, were destroyed by Val. The physical destruction of these storms, coupled with a project-to-project mindset within the department, resulted in a decided lassitude toward another 'new' agricultural model.

Theoretically, of course, farming systems are designed as a framework within which agricultural projects are a component. The philosophy of farming systems is fundamentally different to that engendered by specific commodity cropping projects, which most recently in Samoa, have concentrated on cocoa. Farming systems advocates stress the holistic nature inherent in the systems approach. In the case of Western Samoa, villages developed farming system plans for their land which necessarily incorporate all aspects of village life including reinforcing traditional land patterns, involving community participation and recognition of labour inputs. Such inclusiveness is attractive to proponents of social justice and equity. Critics note that exponents of farming systems clearly see this approach as another, if 'better' way of realistically continuing extension services within the technology transfer mode (Rolings, 1988). The challenge in this project design was to focus on the human resource development within the communities as the centre of the farming system, rather than production, and in this way disaggregating family labour input to reflect and recognise gender.

From a WID perspective, farming systems is noted as presenting a favourable context for the analysis of women's work in agriculture (Spens, 1986). Whereas previous accountings have neglected to credit women's labour as agriculturally productive (Rogers, 1982; Waring, 1988), farming systems can potentially include their labours within and without of the family home.

The farming systems approach was perceived by the well modernised extension agents in the central office as being multi-disciplinary and therefore beyond their job descriptions, demanding of time and inconclusive in outcome. There was both passive and active resistance to some of these ideas, largely driven by the uncertainties of what would be expected in a new system that might potentially be community rather than commodity driven. However, perhaps not surprisingly, the further away the villages and agricultural centres were from head office, the more receptive the audience.

This paper examines the way in which the project was designed to focus on the well-being of the people of Western Samoa, which necessarily means designing a sustainable agricultural system that is sensitive to the environment and production needs. It identifies the importance of designing the project with the communities as a key tool in communicating new ideas; and how, by making visible the work of all the participants in the farming systems -- as in this case, the work of women, project design can address issues of equity and social justice while serving the needs of the state.

Purpose

Among the non-government organisations/people's voluntary organisations (NGO/PVO) and within government development aid institutions (such as the Australian AIDAB), the term Women in Development is much used. Most of the NGO/PVO and government agencies have revised WID criteria to address perceived insensitivities and cultural *faux pas* that have been experienced in 'development' projects. Project partners are generally aware that these criteria are now to be built-in to project design. There is a two-edged sword here as WID may therefore be seen by host governments as yet another form of cultural imperialism on the part of the sponsors, particularly as women's work might not have been a priority consideration in previous development assistance funding. From the other side, recent criticism of WID programs stresses the 'targeting' of women in development projects as another way of managing, rather than empowering, women (St. Hilaire, 1993).

However, recognising the farming systems approach offers the possibility of a system wide analysis and the opportunity as a consequence for synthesis of an agricultural strategy that is inclusive of all inputs. This suggests that the potential to orient a farming system to weight human resource development is dependent on project design and methodology - the flesh on the frame! If women, for example are active in the country's agricultural production at subsistence or commercial levels, with the application of a sensitive social analysis they too will be visible in the project. Secondly, the farming system approach does not usurp the existing structures and rural organisation, but weights them as inputs, including them in a 'rich picture' that comprises the daily reality. Ideally, the local organisations and village committees are strengthened by their inclusion in this picture. The involvement of existing, respected structures, signals positively to the community. Previously unrecognised or unspoken values may be elicited that as part of a community approach, flow-on to other activities. (As a result of community self-awareness, women and men have called for co-educational agricultural training in Western Samoa's high schools.)

Methods & Data Source

The field work is based on extensive and intensive interviews and farm visits on the two main islands of Western Samoa: Upolu and Savaii. This included a detailed study of the current agriculture extension service and the implications for this service as part of a farming systems unit within the Department of Agriculture.

The project design team, which included Western Samoans, was committed to a human resource development model, within the farming systems approach. In the Western Samoa, Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA) techniques appeared to offer the most sensible approach to achieving representative project design. PRA is conceived as an enabling process, whereby communities come together to create a picture of who they are, where they have come from and to plan their future (Narayanasamy, et al, 1993). In the Samoan context the participants can conceivably design and later modify the extension service to provide support for their agricultural labours. In this way they are recipients and facilitators. This methodology has an internal brake on it, that is particularly relevant when considering the structural resistance to acknowledging the work of women in agriculture As well, in this experience, PRA 's open agenda allowed women an opportunity to develop their aspirations with regard to agriculture. (Other extension workers have commented that PRA's flexibility is particularly responsive to the needs of women (Robinson, 1993).) Local people analysing their own situation and developing their own program of change, tends to ensure that the safety features protecting cultural norms that outside designers cannot be aware of, especially if they do not have local language skills or a profound in-country expertise, are considered.

Concerned outsiders offering resources (as well as an often unspoken ideology of development) may push for a certain direction in the project design that suits their own mandate. PRA offers an opportunity for resistance or at least discussion of interests. PRA undertaken by local organisations within their own communities such as the villages in Western Samoa, may not move quickly in the direction of change, or even in the same direction as originally foreseen. However as the ultimate success of the project depends on the people 's support and participation, their involvement in the design, gives impetus to the real possibility that the project achievements will also be real.

A brief example of the merits of PRA in a situation of potential conflict is reflected in the comments generated by the male extension service in response to the question: do Western Samoan women farm? In these meetings, it evolved that the men in the extension service considered women's work to be of a non-commercial value and therefore not agriculture. The idea of consulting women or changing the existing contact system of extension to cater to women's needs was therefore not sensible. However, in countless village meetings and in interviews with women, their description of their daily workload almost always included fieldwork in agriculture. Indeed, except for the possible clearing of land for the planting of taro, they participated in all agricultural tasks. Field visits on Upolu and Savaii confirmed these discussions, emphasising the 'invisibility' of women's work among the all male extension service and indeed within the predominantly male village councils. As a result of the follow-up community meetings, the labour of women was acknowledged by all and described as worthwhile as there was recognition in the benefits that accrued to the family rather than the individual as a result of the crop work that women performed.

In a changing but still strongly traditional society, the inclusiveness of the farming systems approach and experience elsewhere suggested that local rural organisations might offer a way of unpacking the philosophical strength in farming systems and would provide a key design tool for including women in the farming systems project.

As described in Cluer (1989) and Aiono (1983), women's associations have a traditional place in Samoan culture. There is considerable status associated with the role of women's groups in traditional Samoan village life. The Women's Komitis were established in 1925 by the wives of Samoan doctors. Currently in Western Samoa, most village women belong to the Women's Komitis, which are still largely concerned with supporting village hospitals and keeping sanitation and health care at a high standard within the village. In the Samoan context these committees are active and politically stable. They have wide acceptance among the men and are considered a powerful institution for organising within villages.

Through the Women's Komitis auspices it was possible to attend meetings, interview women farmers and discuss the ideas of the farming systems approach. Segregated meetings were initially important, in establishing a wide perspective on agricultural practise and motive. Community meetings were then arranged in which local extension agents took key roles in promoting discussion. The concept of a farming systems approach was explained and women were able to offer suggestions as to how the project might better serve their needs. The flexibility of the systems method impressed them, as there are currently many changes to land use and tenure underway in these villages. Importantly, the enthusiasm of the women, many of whom had high status in their communities, was infectious and encouraged the participation of some local male doubters.

Results and Conclusions

In the case of Western Samoa, the terms of reference for the project design specified that WID be considered. In evaluating the role of women in agriculture, it became clear that women were active but 'invisible'. Women, articulating their work in the project forum, were then able to suggest ways in which the project design for extension services might best serve their needs. The women were aware of the lack of regard for their agricultural roles that some men espoused. They argued effectively for women extension agents and the training of village women as agricultural aides or facilitators. They sought to do this through the auspices of the Department of Women's Affairs. They suggested that the agriculture support be a part of the Women's Komitis in the villages, linking food with health, in a systems way.

At an institutional level it was further recommended that the existing agricultural extension officers and any new recruits have gender-awareness training as a part of their system-wide approach. The Department of Women's Affairs was asked to nominate several women for secondment to agriculture for training as extension officers supporting the women motivators in the Women's Komitis.

The decision to support women's agricultural work through the existing structures of the Women's Komitis reflects the flexibility of PRA and the importance of incorporating traditional systems. Women described their work as part of the family's daily labour, with agriculture as one more task. There were cultural barriers to women meeting male extension officers for field or garden inspections or chats. Therefore it was necessary to consider extension as a community based activity, rather than through the existing system of contact farmers. (The T and V contact farmer system appeared to be somewhat irregularly practised by 1992.)

The obvious advantage of community extension is that if the group is already working together, there is a common basis on which to build. The work of group formation is largely avoided. The extension agent is able to work with a larger number of people, which is more cost-effective for the government (Garforth,1990). In the case of Western Samoa, where the two largest village organisations were mostly segregated along gender lines, some consideration was given to extension system based on extended family units, such as experienced with the modified T and V. The village women vetoed this idea, claiming that such visits tended to be exclusive and irregular. The perception of the women was that as they did the bulk of the field work with the youth, and as they had the Women's Komiti meetings once a month, agriculture could form a part of that meeting.

Extension through existing community organisations respects traditional structures and allows energy to focus on agricultural change--which will no doubt lead to social change in the long run. In this way women can be recognised for their work in the Women's Komitis and the extension support to them seen as a legitimate part of that work rather than the diversion of resources from the individual key farmers of the past system.

Other experiences along these lines indicates that in time, as women are recognised by government for their agricultural input, and as power shifts within communities, the groups may change, splinter, re-form. The extension agent needs to be aware and flexible in approach to ensure on-going support for the efforts of the groups. Again, PRA has no finite time line and allows the community 'picture' to be modified as a consequence of community and government consensus.

The extension agent is faced with the larger change in moving from a commodity only emphasis to a farming systems approach which includes subsistence and market production, as well as gender-specific crops, such as horticultural vegetables produced mainly by women for the urban marketplace. Reality suggests that commodity crops will still dominate as development partners tie assistance to crops required for their markets. Nonetheless, if the farming systems ideas are firmly in place, the location, quantity and production methods by which the commodities are produced will reflect a farming systems plan. This gives the extension agent a sense of surety in that all projects, no matter how fleeting have a context that is sound for the Samoan way (*fa'a Samoa)*. It also provides a more accurate reflection of the extension agents workload, allowing the practitioner to request time and resources in the service and support of all systems participants. Institutions need to organise adequate training and support to ensure that extension staff can perform their extended tasks. Gender inequities within government agencies, such as the agriculture department, require immediate attention so that inequalities in recruitment and promotional opportunities do not inhibit women's abilities to act as members of the extension staff (Goldey, 1987). It is likely that institutional change in this regard will be slower than the recognition of women's agriculture work was among village communities.

Development assistance is often organised and funded with a checklist of requirements that are the priorities of outsiders. These projects often impose their own goals on the departments and communities, and may reinforce existing inequities. It is a challenge to those concerned with this type of work that similar constraints to social justice also be recognised within recipient agencies. By using PRA and RRA techniques, which create a rich picture of the existing situation and the surrounding influences, it is possible for the participants to plan how best to effect change.

As an example, women in Western Samoa were at first invisible in agriculture, their efforts accepted by the society without formal recognition. Their expectations of themselves and their society were no doubt coloured by that situation. The farming systems design project gave women a vehicle by which they could speak out with regard to their agricultural work. It also gave them control of the handbrake so that they could regulate the terms of recognition. This is an important point for those involved in project design. An analysis of the risk factor associated with working through this traditional service organisation, must consider the possibility of opposition from the *fono* (village council). However, in this case, because of the strong orientation of the women to use their agricultural incomes in community works or for *fa'alavelave* (obligations), the risk factor is minimal at this point in time. The decision to orient part of the extension service towards the Women's Komitis did not necessarily suit the extension service as it existed. However, by centring the work of women in the project design, they have been made 'visible'; which encourages the development of an extension program that includes their activities and needs. In effect, women's participation has become a legitimate indicator of the project success and is useful for monitoring and evaluation.

As a result of the farming systems project input, the Government of Western Samoa set up several task forces to advise on agricultural policy formation, one of which is The Women in Agriculture Task Force. Following this initiative a government sponsored Women in Agriculture Survey took place in 1993.

Educational Importance

Commitment to local solutions, local knowledge, local organisations and equity are cornerstones of community based extension work. This is as true in industrial nations as in Western Samoa. Of particular importance in Western Samoa was the fact that the farming systems project offered a harmonious link with participatory extension methodology. Local people assisted in the project design. In this way participatory rural appraisal involved communities in the change process right from the beginning.

Extension agents are often caught out, left to be the carrier of bad news between government and the people. In the Western Samoan case study, the extension agents were wary increasing their workload by activating the population on a community wide basis. However, the long term prognosis for community based extension is that it is more likely to be successful. Firstly, it reflects a larger part of the population than individuals could contact on a one-to-one basis. Secondly, it provides the extension agent with a good source of widely-based, accurate information. Thirdly, it recognises that people, the human input, are critical to the success of any agricultural plan or strategy. The new status for the extension agent is to be the facilitator of many, rather than a few.

From an environmental perspective, farming systems projects provide a practical reminder of the importance of group or community action, as strategies for water catchments and soil degradation cannot easily be handled by individuals.

Women in Samoa weave some of the most beautiful fine mats as part of their recognised, traditional labour for their families and villages. These mats are exchanged in all important social ceremonies. Great status is given to fine mat weaving and when describing their daily work, women say, "there is always another mat to weave"--indicating their commitment to the continued well-being of their families and at a more basic level, the recognition that women's work is never done. In agriculture, women have taken up a significant part of the active field labour and they are very clear in their discussions that it too is women's work. Project design and implementation that failed to acknowledge that input, would limit their potential contribution, in effect, sweeping their labours under the mat. Samoan women would still perform those agricultural tasks only without extension support.

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Session L INNOVATIVE UNIVERSITY PROGRAMS

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IMPACTS OF AN EXTENSION FOREIGN TRADE PROGRAM BUILT ON MENTORING AND TEAMWORK

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Association for International Agricultural and Extension Education

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Introduction

Extension professionals enjoy a long and noble tradition in the United States. That tradition has focused characteristically on educational and/or advisory work in such areas as production agriculture, natural resource management, family life, programs for youth, and community and rural development. However, as other traditions have eroded or have been reshaped in the path of globalization around the world, thus is the extension worker called upon to rethink approaches, reidentify goals and objectives, and discover new roles in these changing and challenging times (27, 35). One such role is that of agricultural export trade enhancement (22, 24). That role has been successfully executed at Washington State University during the past seven years and constitutes a story worth telling (37).

Your reader today is Extension Trade Specialist at that institution and the dynamics of the extension foreign trade program reflect not only the unique strengths of the specialist himself but also the subject matter knowledge and skills of several of the extension faculty members at Washington State University (22). When the extension trade role was conceptualized in 1988, it became Extension's contribution to the International Marketing Program for Agricultural Commodities and Trade, known in Washington as the IMPACT Center (26). It likewise coincided with the repatriation to the United States of your reader who brought the benefits of an international career, language and intercultural skills, private and voluntary sector experiences and academic preparation in agriculture, foreign trade and extension education to bear on the newly created task (28).

Purpose

This paper purports to describe the conduct and general outcomes of agricultural export enhancement activities by extension faculty members at Washington State University and in critical marketplaces abroad and to explain the dynamics of mentoring and teamwork as they drive those activities. Those dynamics and activities have worked together phenomenally well to develop a cadre of market informed and culturally sensitive extension workers who are acting at the interface between the university and agricultural export industries in ways that impact decisions about offshore trade (30).

Methods

In Washington State current levels of agricultural exports reach $1.5 billion annually, contributing heavily to the state's economy and significantly to the nation's balance of trade. Washington ranks second in the country in export product diversity and third in total export value. This is enhanced, not only by agricultural productivity, but also its geographic proximity to NAFTA and APEC trading nations. Among Washington's exports are apples, milk, wheat, beef, potatoes, hops and hay followed by barley, dry peas, lentils, mint oil, cherries, prunes/plums, grapes, onions and wines. Many commodity groups and commissions actively promote Washington's agricultural bounty in the markets of Canada, Latin America, the Pacific Rim and the Mediterranean (37).

Yet, many current and potential exporters do not adequately understand nor seek to understand the myriad factors at work in the marketplaces of the world. Among those factors are cultural sensitivities, language awareness, business practices, transportation options, distribution systems, product shelf life, quality concerns, pricing, seasonality and consumer behavior (12, 29). It is this complex information gap that is being effectively narrowed by extension professionals at Washington State University who submit to a continuous mentoring process involving the international, multicultural skills of the Extension Trade Specialist and who respond with production and commodity expertise inherent to Extension Agents' and Specialists' personal and professional strengths. The teamwork that results is particularly effective in the dispatch of extension trade enhancement missions overseas in search of information critical to making agricultural exports successful. Domestic extension personnel become aware, sensitive and knowledgeable about target markets for the products they work with in local programs and the trade specialist is able to rely on the commodity expertise so important to overseas clients (28, 30, 31).

The on-site studies and subsequent consolidation of findings lead to early playback for Washington's agricultural organizations and communities through educational presentations, audio-visual programs, academic seminars, popular articles, panel participation and reference publications (27, 37).

Results

The impacts of the interaction of extension trade teams, using mentoring and teamwork to produce useful findings and influence decision making, is well-known and widely accepted by agricultural exporters in Washington State. The outcomes of offshore exploraties produce two general types of information. The first is descriptive of target markets for selected products or commodities. The second is analytical of competitive nations' production and trade capabilities and policies. The combination of these two types of findings assist producers and traders to better understand world markets. Washington State University's extension foreign trade program has produced direct benefits to a number of product and commodity groups (37).

Meats exports to Japan, Korea and Canada have increased significantly during the tenure of the program. Analyses of both markets and competitiveness in the context of the U. S.-Japan Beef Agreement, CFTA and more recently the GATT and NAFTA provided critical information to this growth (6, 7, 8, 9, 13, 16, 17, 18, 23, 26, 33, 34). Similarly, Christmas tree exports to Mexico increased 100% from the 1992 to the 1993 holiday season, a gain directly related to product education and liaison by an extension team in the fall.

Market share maintenance and expansion work on dry peas and lentils contributed to increased exports to Algeria, Egypt, Sudan, Peru, Venezuela, Panama, Colombia, Sri Lanka and Bangladesh while competitiveness assessments were carried out by WSU extension teams in Canada, Hungary, Turkey, Chile and Argentina. Notably, offshore market penetration by the Washington-grown crimson lentil is directly linked to extension market development efforts (3, 5, 10, 11, 25, 32, 36). Exports of whole-seed canola from southeast Washington to Japan became active after a thorough competitive assessment of the Canadian canola industry and an on-site study of the Japanese canola import, crushing and distribution complex in Tokyo and Yokohama (1, 2). Washington export trade in hops which is critical to the beer industries of Brazil, Colombia, Mexico, Peru and Venezuela was assisted by two extension trade service missions to those regions (36).

A major success story is that of Mexico emerging as the largest world market for Washington apples and pears and growing ten-fold in the 1992 market season. Replacing Taiwan as the prominent tree fruit market, Mexico maintained its preeminence during the 1993 market season with apple exports reaching nearly 6 million boxes and pears peaking to 1.3 million. In that dynamic market, Washington fruit competes seasonally with an aggressive Chilean export campaign as well as with the Mexican apple industry itself. Additionally, Washington successfully penetrated the Spanish apple and pear market in 1992. These accomplishments were assisted and sustained in important ways by WSU extension findings on fruit transportation, handling, distribution and pricing in Mexico and Spain as well as tree fruit competitiveness studies in Chile and Argentina (4, 14, 15, 19, 20, 21).

The 1994 extension foreign trade program at WSU is expected to embrace market penetration work in Mexico for sweet cherries and wine, market improvement and expansion work in Mexico on Christmas trees and market development work worldwide for kabuli and desi chickpeas.

Educational Importance

There can be little doubt associated with the educational value of an innovative extension program which empowers area extension agents and subject matter specialists with the insights, knowledge, experience and sensitivities to be relevant resource persons in international trade. As informed and active members of the trading network they may better advise agricultural producers and exporters as they position themselves and their industries to compete in the global economy. Extension at Washington State University, through mentoring and teamwork, has seized the moment in implementing a truly cutting-edge program (24, 37).

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The Impact of the Regional Centers for Research, Teaching, and Extension on the Educational Function of the Colegio de Postgraduados[1] , Mexico

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Introduction

For decades, higher agricultural education institutions of Latin America have been criticized because they have not responded to the needs of development demanded by agriculture. Curricula that were incompatible to agricultural education objectives, lack of linkage between the educational institutions and the rural communities, and little integration among research, teaching, and extension, were some of the main concerns (Olcese, 1965; Pino, 1974; ALEAS, 1985; FAO and ALEAS, 1991). Conscious of those problems, some institutions in the region implemented creative programs in order to improve their educational functions. The Colegio de Postgraduados (CP) of Mexico was one of them. This graduate college, since 1976, created four regional centers with the purpose of linking the educational function with the agricultural and rural problems of the regions. The regional centers were located in places with different ecological and socioeconomic characteristics of the country. The belief was that the regional centers would be similar to natural laboratories in which the institution learned by conducting research, teaching students, and extending services to the farmers. The regional centers would make possible to incorporate new conceptual, theoretical, and methodological elements into the study programs (Casas et al., 1977). In spite of some signs of progress, the community of CP has had increasing concern about the role of the regional centers in relation of the objectives of the institution. What has been the impact of the regional centers experiences in the educational functions of the institutions? Specifically, how have the activities of research, teaching, and extension, carried out in the regional centers by faculty members affected the education of students?

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[1] One of the main higher agricultural education institutions of Mexico to prepare professionals at Master's degree and doctorate.

Purpose

The purpose of the study was to assess the impact of the regional centers for research, teaching, and extension on the educational function of the Colegio de Postgraduados. In order to accomplish this purpose, an evaluative study was conducted in terms of determining faculty members' and students' perceptions of the impact of their participation in the regional centers upon their professional development and educational performance.

Methods

The design used for this study was the descriptive survey method. Data were obtained from campus faculty[2] (70), regional center faculty[3] (40), and students (76) of the Colegio de Postgraduados. The samples were selected using the stratified random sampling technique. Three kinds of questionnaires were designed to collect information. They were hand-delivered to the subjects. Also, direct observation, informal interviews face to face, review of official documents and records were employed. Reliability analysis, descriptive statistics, t-tests, one-way analysis of variance, factor analysis, and Pearson's correlation were used to analyze data.

Results and Conclusions

Findings are arranged under the following headings: 1) Demographic description of the respondents, 2) Participation of campus faculty in the regional centers, 3) Improvement of academic performance as a result of faculty members' activities in regional centers, 4) Reasons for low participation of campus faculty in the regional centers, 5) Participation of students in the regional centers, 6) The educational performance in the Colegio de Postgraduados as perceived by students, and 7) Perception of faculty members and students regarding principles and concepts of agricultural education.

Demographic description of the respondents

Participants in the survey were predominantly male: 80.0% campus faculty; 92.5%, regional center faculty; and 85.5%, students. The average age was: 40.7 years old among campus faculty, 35.2 among regional center faculty, and 31.1 among students. In both campus and regional center faculty, the group holding a master's degree was larger than those holding a bachelor's and doctorate (51.4%

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[2] Faculty members working on campus.

[3] Faculty members working in the regional centers.

and 82.5%)[4] . Yet, the group of faculty holding a doctorate was almost half (47.1%) among campus faculty, compared to only 15.5% among regional center faculty. The distribution of faculty members by academic rank was not the same for faculty from campus and regional centers: while Professors or Associate Professors was the largest group among campus faculty (45.7%), Assistant Professor was the largest group among regional center faculty (47.5%). Finally, on average the largest percentage of campus faculty (50.2%) and regional center faculty (50.3%) spent time on research activities. This result was different from that found by Macías-Lopez (1990) in his study of professors and graduate students of Mexico, Central America, and Caribbean agricultural education institutions. In that study, teaching was the activity in which faculty members spent the most time (41.9%).

Participation of campus faculty in the regional centers

Campus faculty were asked to rate five levels of frequency of participation in the regional centers. The scale utilized was of 1=never to 5=very frequently. Findings indicated participation of campus faculty in the regional centers was very low ($\bar{x}$=1.81; S. D.=1.03). In order to find differences of the degree of participation between or among groups, t-test and one-way ANOVA were used. Groups were compared by age, academic degree, and academic rank. When groups were compared by age (from 25 to 34, from 35 to 44, and from 45 or more), and by academic rank (Professor or Associate Professor, Assistant Professor, and Instructor or Research Assistant), one-way ANOVA showed highly significant difference (p=0.01) among groups in both cases. The interpretation of the Scheffeé post-hoc analysis indicated that the groups who were 25 to 34 years old and those in Assistant Professor, and Instructor or Research Assistant participated less frequently than those older than 34 years old and those in Professor or Associate Professor ranks. When groups were compared by academic degree (master's and doctorate), a t-test analysis indicated a highly significant difference (p=0.01) existed between the two groups. The group holding master's degree participated less frequently than those holding a doctorate.

Improvement of Academic performance of Faculty Members as a Result of their Activities in the Regional Centers

One of the main objectives of this study was to assess the impact received by faculty members as a result of their activities in the regional centers. The theoretical foundation of the assumption that faculty and students might gain practical experience and knowledge and change their attitudes, forms of thinking and acting, as a result of their participation in planned activities, is explained in the

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[4] For this study restriction was imposed on the selection of the population. The study was limited to full time faculty and those with responsibilities of research, teaching, and extension. However, official records (Colegio de Postgraduados, 1992) indicated a very few cases of part time faculty.

Leontiev's theory of action (Zuber, 1991). Briefly this theory is explained. The action may refer to any aspect of learning, teaching, or other professional activities. Whether the action is practical (exterior) or mental (interior) its aim is to be reflected, refracted or transformed in the subject's consciousness together with the product of action (the object) which is also to be reproduced in the subject's consciousness.

In order to assess their perception of their academic improvement as a result of their activities in the regional centers, campus and regional center faculty were asked to rate nine statement of likely gained knowledge, experience, and changes in their attitudes as a result of their activities in the regional centers. To rate each statement, the scale of 1= nothing to 4 = strongly was used. In general terms, campus faculty's perceptions of acquired knowledge or experience or changed attitudes as a result of their participation in the regional centers was slight. The three items rated most highly were close to the midpoint of the scale. They were "practical experiences" ($\bar{x}=2.59$, S.D.=1.18), "understanding agricultural problems of the region" ($\bar{x}=2.57$, S.D.=1.15), and "understanding of ecological problems of the region" ($\bar{x}=2.49$, S.D.=1.06). On the contrary, regional center faculty felt strongly their improvement as result of their activities in the regional centers. All the nine statements were highly scored; "gained practical experiences" and "gained understanding of agricultural problems of the region" had the highest average scores ($\bar{x}=3.70$, S.D.=0.61 and $\bar{x}=3.6$, S.D.=0.54). To find differences between the two groups, campus and regional center faculty, t-tests were used. The results revealed that there were highly significant ($p=0.01$) between the two groups for the nine statements.

In addition, campus faculty were asked to rate nine statements in regard to the importance of their gained experiences and knowledge in the regional centers to improve curriculum and other academic aspects. To rate each statement the scale of 1=nothing useful to 4=very useful was utilized. In general terms, campus faculty felt that their gained experiences and knowledge in the regional centers were slightly useful for improving curriculum and other academic aspects. They felt that their acquired experience and knowledge in the regional centers were useful mostly to "improve research methods" ($\bar{x}=2.65$, S.D.=1.20) and "priorize research areas" ($\bar{x}=2.59$, S.D.=1.22). Large standard deviation indicated a wide range of perceptions by respondents.

Participation of Regional Center Faculty in Academic Activities on Campus

Faculty from regional centers were also asked about the frequency of their participation on campus by type of activity. The scale of 1=never to 5=very frequently was used. The results indicated that regional center faculty rarely participated in academic activities on campus (teaching: $x=1.87$, S.D.=1.14; research: $\bar{x}=1.85$, S.D.=1.18; and other activities: $\bar{x}=2.27$, S.D.=1.48).

Reasons of Low Participation of Campus Faculty in Regional Centers and Faculty from Regional Centers on Campus

Because of anticipated low participation of campus faculty in regional centers and faculty from regional centers on campus, faculty members were asked to rate seven statements of potential reasons for their lack of participation. They were asked to complete any other additional reasons of their lack of participation in an open-ended question. To rate the statements, the scale of 1=completely disagree to 7=completely agree was utilized. Findings indicated that although faculty of both campus and regional centers did not completely agree with the suggested reasons for their low participation, they agreed with the following statements: lack of communication among campus and regional center faculty, lack of institutional support, and lack of institutional sources.

Participation of Students in the Regional Centers

From the definition of regional center it was inferred that the regional centers constituted a means through which professors and students had the opportunity to interact, learn, and gain cognitive and affective knowledge. Based on that assumption, students were asked about their frequency of participation and means of becoming familiar with the regional centers. The scale of 1=never to 5=very frequently was used. Findings indicated that students participated rarely in the regional centers ($\bar{x}=1.51$, S.D.=0.55). To determine wether familiarity took place as part of the planned process of teaching-learning or not, students were asked about the means by which they became familiar with the regional centers. They were suggested to respond to five statements of provable answers. Frequencies and percentages were used for the analysis. Findings indicated that students became familiar with the regional centers mostly by "other means" (30.3%). This means that familiarity with the regional centers took place mostly not as part of planned teaching-learning process by the institution, but through other means, such as visiting the region for a particular interest, working in the region, or through friends and peers.

Educational Performance in the Colegio de Postgraduados (CP) as Perceived by Students

Based on the definition of regional centers it was assumed that the educational function of the CP would be more effective if faculty members and students participated in the regional centers. Curricula, programs, and teaching methods would be improved as a result of the gained knowledge and experiences by faculty members in the regional centers. To what extent was this happening in the CP? This was the principal question. To assess the educational function in the CP, students were asked to rate 30 statements regarding to principles and desired educational aspects that should be met and applied by in the institution. The statements were grouped into six groups of common content: 1) teaching and learning, 2) content of the courses, 3) plan of study, 4) competency of professors and instructors, 5) academic and social environment in the institution, and 6) competency of graduates. According to findings, students agreed in general that the principles and other desired educational aspects were met or applied in the CP. Students agreed with the following statements: "the instructors are qualified professionals" ($\bar{x}$=6.05, S.D.=0.98), "the graduates have solid and balanced preparation" ($\bar{x}$=5.72, S.D.=1.05), and the instructors are supportive" ($\bar{x}$=5.67, S.D.=1.37). Students slightly agreed with "the institutional environment invites students to participate in academic and social activities" ($\bar{x}$=4.67, S.D.=1.66), and "the institutional environment is supported by strong leadership" ($\bar{x}$=4.47, S.D.=1.63). This result seemed indicate that students perceived that educational principles and desired educational aspects were met in the CP. However, participation of faculty member in the regional centers was low. This might suggest that regional centers are not relevant to improvement of educational performance in CP. Yet, this conclusion would be erroneous. The reviewed literature (Hernández,1988 and Telis, 1988) on educational aspects of the CP suggests that detailed and deep studies about educational performance are required.

Perceptions of Faculty Members and Students Regarding Principles and Concepts of Agricultural Education

To what extent did faculty members and students agree or disagree with the basic principles and concepts of agricultural education? And how were their perceptions of those principles and concepts related to their degree of participation in the regional centers? This were the questions to be answered in this section. A literature review provided the basis for 25 statements regarding integration of teaching, research, and extension, integration of theory and practice in the process of teaching-learning, agricultural professional competency, the role of agricultural education institutions, professional training in developing countries, importance of small scale agricultural producers, and the definition of regional centers. Respondents were asked to rate each statement on a scale of 1= completely disagree to 7= completely agree. Results show that, in general terms, respondents agreed with the 25 statements. Respondents completely agreed with the following statements: "teaching-learning process must be carried out through the integration of theory and practice..." ($\bar{x}$=6.67, S.D.=0.55), and "agricultural universities should contribute importantly to the discovery of future agricultural practices that are socially desirable, culturally feasible, and ethical defensible" ($\bar{x}$=6.50, S.D.=0.69). In order to find if campus faculty's perceptions of those basic principles and concepts were related to their degree of participation in the regional centers, analysis of correlation were made. The results indicated that no relationships existed among campus faculty's perceptions of the basic principles and concepts of agricultural education and their degree of participation in the regional centers. This does not mean, however, that academic activities of faculty members were not related to their basic beliefs and values about agricultural education, decisions upon their participation in the regional centers could be more related to external factors such as the organizational structure of the institution, the administration system, and social and economic factors.

Conclusion

The results of this study provided elements to conclude that in spite of the educational potentialities of the regional centers, they were not being fully utilized. The study found that participation of campus faculty in the regional centers was low. Those who participated in the regional centers perceived that they did not improve their professional competency very much as a result of their activities in the regional centers. On the contrary, regional center faculty felt strongly that as a result of their activities in the regional centers they gained knowledge and experiences and underwent changes in their attitudes and forms of thinking and acting. However, faculty from regional centers perceived that their participation in academic activities on campus was very low. The main reasons for low participation of campus faculty in regional centers and faculty from regional centers on campus were lack of communication among faculty members, lack of institutional support, and organizational structures of the institution. Participation of students in the regional centers was also very low. Students became mostly familiar with the regional centers not as a result of planned academic activities of the institution but through other forms, such as personal interest, previous work in the region, and by peers. In spite of low participation of campus faculty and students in the regional centers, students perceived that educational principles and desired educational aspects were met in the Colegio de Postgraduados. Also, Faculty members and students agreed with most of the basic principles and concepts of agricultural education. Yet, no relationships existed among campus faculty's and student's perceptions of the basic principles and concepts of agricultural education and their degree of participation in the regional centers.

Educational Importance

To be more effective in their function and role, educational institutions should become aware of the processes, context, results and potentialities of their programs. For that, institutions should continuously make assessments and evaluations of their programs. This is even more urgent in a time of drastic changes in the political and economic concerns, as it has been in Mexico. Agricultural education institutions, in order to respond effectively to the needs of agricultural and rural development, need to revise their institutional components including their programs. The concept of regional centers as exemplified by the Colegio de Postgraduados may be an innovative form that will serve as a model for agricultural education institutions in Mexico and in Latin America. It has the potential for overcoming the weaknesses of conventional educational models practiced by many institutions where the teaching-learning process has been carried out mostly at classrooms and laboratories with little or no interaction with farmers and their environment. As a consequence, national and international institutions have urged the adoption or creation of linkages between educational institutions and rural communities for their mutual benefit, a situation in which professors and students work together and learn from each other.

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COOPERATIVE EFFORTS FOR AGRICULTURAL EXTENSION AND RURAL DEVELOPMENT: A CASE REPORT ON THE DEVELOPMENTAL NATURE OF THE CURRENT MICHIGAN STATE UNIVERSITY-CHINA CONNECTION[1]

INTRODUCTION

Since the close of World War II in 1945 and beginning in the '50s, most colleges of agriculture in the United States have entered into various kinds of agricultural projects with countries around the world. Many departments of agricultural and extension education have been involved in international work. In the years immediately after World War II there was much hope placed in the work of agricultural teachers and extension workers as the means for improving food production in the many food scarce countries. Most frequently those programs and projects were characterized by pre-determined objectives, time frames for accomplishing various goals, staffing plans, and commitments of resources by the institutions involved and the funding agencies. Sometimes long-term professional relationships evolved as a consequence of international students getting degrees at U.S. institutions, then returning to their home countries to enter into research and teaching activities.

PURPOSE

The purpose of this paper is to provide background information about the history of relationships between China and Michigan State University and then to focus on the developmental nature of the current efforts in the area of agricultural extension and rural development, mainly, but not exclusively, with Beijing Agricultural University. This effort is different from most previous MSU arrangements in that a workplan, not a contract, is the formal starting point for planning and conducting various activities during the coming year, some of which will be in Beijing and others in Michigan and other parts of the United States.

Background information will be provided for the two key characteristics which are to guide the future relationships and which undergird the current workplan: 1) the desire to have a developmental relationship between MSU, Department of Agricultural and Extension Education and the Beijing Agricultural University, International Center for Rural Development; and 2) the goal of gaining greater international understanding on the part of faculty and students at both institutions for enhancing future programs.

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[1] Dr. Frank L. Brewer, Professor, Agricultural and Extension Education; and Dr. O. Donald Meaders, Professor Emeritus, Agricultural and Extension Education, Michigan State University, East Lansing, MI 48824-1039. A paper presented at the Tenth Annual Conference of the AIAEE, Arlington, Virginia, March 24-26, 1994.

BRIEF BACKGROUND

Work in international agricultural and extension education by faculty members at Michigan State University began in the early '50s in programs in Cuba, India, Philippine Islands, Okinawa and China. These early efforts were by individual faculty members who took leaves of absence from their positions at MSU in order to carry out special assignments from four months to two years in curriculum development, agricultural teacher education programs, research, preparation of instructional materials, and other similar activities.

The relationships to government and educational institutions in the Peoples' Republic of China began in the '70s and has expanded during the last five years. In the larger picture for the College of Agriculture and Natural Resources, memoranda of agreement have been signed and implemented with several universities, research academies, and governmental units for the purpose of facilitating exchanges of scholars and researchers, conducting research, participating in workshops and conferences, and other activities.

Institutional Relationships

The relationship between China and Michigan State University includes working with and having formal agreements of cooperation with the Chinese Academy of Agriculture Sciences, the Sichaun Agriculture University, the Institute of Botany, Academia Sinica, the Heilongjiang Academy of Agriculture Science of the Peoples' Republic of China, the National Agricultural Technological Extension Centers of China, the Northeast Agriculture College in Harbin, and with the Beijing Agriculture University.

Professorial Experiences

In the late 80's, a sixteen person team of MSU Extension field staff and specialists visited the Pacific Rim, including Southern China, to learn about agricultural developments and opportunities for marketing U.S. and midwest agricultural products. The period in China provided new insights and generated interest and enthusiasm towards continued involvement with China.

During a 14-month period from October 1990 to December 1991 three of the agricultural and extension education faculty each gave lectures on extension at the Northeast Agricultural College, Harbin. The associated field trips and discussions sparked much interest in learning more about the agricultural and rural development activities carried out by the Chinese in their systems of education. Discussions with officials in Beijing provided additional insights into the tremendous scope of extension activities and the challenges to increasing food production for a growing population with reducing natural resources.

In January 1992, one of the MSU professors of agricultural and extension education gave a series of lectures at Fujian Agricultural College and Beijing Agricultural University, accompanied by extensive briefings, field trips, and discussions regarding the role of the agricultural colleges and universities in agricultural and rural development. It became apparent that many strategies were already in place for trying to decentralize the planning in agriculture and convert to a market driven economy within the Chinese traditions of planning, vertical integration for decision-making, and multitude of agencies involved with educational programs. Vocational agriculture schools, correspondence schools, adult farmer classes conducted by agricultural schools, educational programs by organizations of farmers by commodities, and many other approaches in addition to extension programs are but a part of the complex picture for agricultural and rural development efforts in China today.

Emerging Institutions

Beijing Agricultural University, with its Center for Integrated Agricultural Development, has extension-type programs of training, publication, and developmental research, all well-grounded in on-going community/township field demonstration programs. The youthful, well-educated, dedicated staff provides a base for pioneering different roles for the university in agricultural and rural development.

Through work with the National Agricultural Technological Extension Center (NATEC), a group of sixteen extension officials from the Chinese National Agriculture Technology Extension Center were trained at MSU in 1992 and an additional group of four NATEC administrators including the director of extension and three deputy directors participated in an AEE training program at MSU in the fall of 1993. From these interactions three visiting scholars were invited to MSU from China to work for 6 months as adjunct faculty members in the Department of Agriculture and Extension Education. These visiting scholars included a NATEC deputy administrator, a program officer from the Department of International Cooperation within the Ministry of Agriculture and a Masters candidate in AEE who is the deputy division chief of the China International Center for Economic and Technical Exchanges.

These interchanges and interactions have led to the close relationships between the Chinese Extension Service, Michigan State University, Department of Agriculture and Extension Education and the MSU Institute of International Agriculture. As one outgrowth from this cooperation, the Institute of International Agriculture developed a training program for Chinese Rural Development leaders in the areas of agriculture, business and trade. Since September of 1992, 126 Chinese Rural Development extension and business leaders have participated in eight different training programs at MSU. Delegates included representatives of the Chinese National Agrotechnology Extension Center, the China State Planning Commission, and business and government leaders from Guizho, Gansu and Shanxi provinces.

The China programs are supported by a variety of departments within the College of Agriculture, including Agriculture and Extension Education, Agricultural Economics, Crops and Soils Science, Center for International Business Education Research, and Michigan County Extension Offices. In addition to Michigan State University faculty, many other state and local organizations supported the training of the Chinese, including the Michigan Departments of Agriculture and Commerce, Michigan Farm Bureau, Michigan Association of Insurance Companies and food and manufacturing industry representatives within Michigan.

INITIATIVES PLANNED FOR IMMEDIATE FUTURE

The Chinese have recognized the need for training of administration leaders to help China move from a central planned to a market economy. Through this training, linkages have been formed with the Beijing Agriculture University, with both MSU and BAU representatives meeting in China and at MSU to strengthen this relationship, and which has lead to the development of this **joint rural leadership development project proposal for the poor and remote regions of China.** This proposal calls for the Beijing Agriculture University to identify key leaders from the poor and remote areas of China for training at the Beijing Agriculture University, followed by field visits to successful rural development projects in China. Additional training on rural development and leadership, utilizing the western model, will take place in the United States. From the training and site visits, both in China and in Michigan, participants are expected to become a cadre of rural leaders in China and generate new possibilities for linkages and development of projects in the poor and remote areas of China.

Planned initiatives at MSU include the designation of a twelve-person team of campus and field faculty, sponsored by the Institute of International Agriculture, to visit China in June 1994 and strengthen these ties while providing MSU faculty with in-depth understandings on China, its people and its environment for agriculture, rural development and change.

Other activities planned include a joint international workshop in China with the Chinese Academy of Agriculture Sciences, additional visiting scholars from China and the BAU to MSU and the expanded potential of MSU graduate students working with BAU and BAU students doing research and rural development study at M.S.U.

RESULTS

Four faculty members now have experiences working in China and working in Michigan with visiting scholars, graduate students, and study groups from China.

In addition, the base of additional professional workers in agricultural and extension education both in Michigan and in China, with experiences shared through various study and exchange programs, has been greatly expanded.

International and domestic graduate students have gained from interaction with the various study groups which have come from China.

This base of experiences is a foundation for future developments and for new understandings with potential for use in future programs. Both MSU and Beijing Agricultural University are involved in developmental efforts, looking at present-day emerging roles for their respective universities in extension or outreach and rural/community development.

CONCLUSIONS

The experiences of the three MSU professors of agricultural and extension education in China were a strong basis for the renewed efforts to learn from the Chinese and to avoid parochialization of the graduate education program at MSU. In addition, the viewing of programs in countries like China, becomes a strong basis for learning more about the fundamental principles on which the Michigan Extension program and agricultural education programs are built.

It is possible, and even desirable, to develop mutually beneficial relationships with groups in other countries **without having a formal contract with external funding.** Some of the most satisfying relationships can come from the mutually planned and conducted activities which are natural at a particular point in time.

EDUCATIONAL IMPORTANCE

The Extension service at Michigan State University is currently undergoing a basic philosophical review, named by some as "Redefining University Outreach." This review and redefinition of extension programs, or outreach, which is probably typical of what is happening at many other universities in the United States, can benefit from knowledge of institutions in other countries. We need to learn to de-parochialize our thinking when attempting to provide better, and more efficient ways to help people and institutions as we approach the 21st century.

The interchange with the professional educators from China has provided a laboratory for our graduate students to learn how to organize groups and how to work with them. This has included graduate students from many other countries who bring some of their own unique experiences and different cultures to bear in discussion groups.

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The Need for U.S. and International Collaborative Rural Leadership Education for the 21st Century: {A Case of the Wisconsin Rural Leadership Program (WRLP)}

By
V.G. Dhanakumar, Boyd Rossing and Gerald A. Campbell

Introduction

The specific competencies needed for effective global leadership can be gleaned from previous research on predictors of expatriate success, as well as observations made by participants and educators in cross cultural training programs (Lobel, 1991). Several studies have suggested that educational attainment was a primary indicator of individual leadership ability. But questions of where and how educational experience contributed to leadership development remained unanswered (McKinley et al 1993). Over the past 25 years many U.S. land grant universities have developed intensive leadership development programs to accelerate the development and subsequent performance of rural leaders (Rossing and Heasly 1986). However, questions have remained about the long run impact of such programs on leaders and their communities. In meeting this challenges, rural America's greatest resource is its leaders. They must be able to view change in a broad perspective and be prepared to provide the wise leadership that 21st century challenges will demand. A recent study of the Wisconsin Rural Leadership Program (Campbell, Dhanakumar and Rossing 1993 and 1994) sheds some light on such issues.

Wisconsin Rural Leadership Program (WRLP)

The Wisconsin Rural Leadership Program, Inc. (WRLP), began in 1983. It was created by a university and private sector coalition of leaders with agriculture and natural resource interest. Initial "seed money" came from a grant from W.K.Kellogg Foundation. That grant has been augmented by gifts from corporations and individuals. WRLP, Inc. was organized exclusively for educational purposes under Wisconsin statues in 1985. From the beginning, the program's primary aim has been to strengthen rural community and public affairs leadership across Wisconsin. As of July, 1992 WRLP has 118 (Groups I-IV) individuals who have successfully completed the program.

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The purpose of the Wisconsin Rural Leadership Program (WRLP) is to provide promising "rural leaders" an opportunity to participate in a two-year leadership and issues education program. Over time the program can result in fundamental change in community, economic, political, and social systems in rural Wisconsin. The WRLP, develops in participants an increased knowledge of national and international economics and social change; a greater awareness of organizational decision-making processes and the role of political institutions; a greater sensitivity to the needs of society; and preparation to deal with complex issues impacting rural life.

The program is operated by the University of Wisconsin-Extension, Cooperative Extension through a memorandum of understanding with the WRLP Board of Directors. The board members include representatives from agriculture, agri-business, natural resources, and other business, state and local government and the five University of Wisconsin System institutions with agriculture and natural resource programs.

OBJECTIVES OF THE PROGRAM

The Wisconsin Rural Leadership Program has been established to meet the challenge of building the next generation of rural leaders with the following objectives:

- To increase and broaden participants' understanding of U.S. and international economic, political and social systems;
- To broaden the participants' perspectives on the major issues facing the society;
- To increase participants' abilities to make analytically sound and wise decisions in their leadership positions, now and in the future.

Purpose

A major objective of this research was to derive a better understanding of the dynamic forces currently affecting the relevance and effectiveness of WRLP for rural leadership education and to advance general knowledge and theory about rural institution-building and sustainable development in the U.S and abroad. This paper also deals with the following themes:
1. Factors affecting program participation; 2. Impact on participant capacities; 3. Impact on participant actions and 4. implications for rural leadership development in the U.S and developing societies.

Methodology

Sample

All 118 WRLP graduates from the first 4 groups {Group I(28), Group II(30), Group III(30) and Group IV(30)} were included in this study.

Instruments

Two types of survey instruments (part 1, quantitative and part 2, qualitative) were designed to obtain data for achieving the objectives of the study. The instrument set was validated by a jury of three experts on the staff of the Department of Continuing and Vocational Education of University of Wisconsin-Madison, and UWEX-Cooperative Extension Service and Community Dynamics Institute of the University of Wisconsin-Extension. Revisions were made following this jury review.

The instrument was then pilot tested via telephone and/or face-to-face interview with ten WRLP graduates. Revisions were made in the instruments following this procedure. This study was descriptive, exploratory and analytical in nature and relied on both qualitative and quantitative data.

Data Collection

The data was collected with a two part survey. Part 1 consists of a set of rating items which were completed by WRLP graduates and returned to program staff by mail. Part 2, consists of a set of questions to explore rural leaders' community activities through telephone and/or face-to-face interview. In September 1993, both part 1 and 2 of the survey were sent to all 118 alumni of group I to IV WRLP. Three weeks later, a letter and another copy of the survey form was mailed to non-respondents encouraging them to complete and return the surveys and/or talk with the researcher over the telephone.

One-hundred ten of the 118 WRLP participants responded to part 1, and one-hundred five out of 118 participants responded to the part 2 telephone interview. Group IV had the highest response rate (96.6 and 100%) and group II had the lowest response rate (83.3 and 86.6%) for both part 1 and 2 of the survey respectively.

Results and Conclusions

Wisconsin Rural Leaders Demographics

The percentage of male participants ranged from 48.2% in group III to 69.2% in group II. The percentage of married participants ranged from 76.7% in group IV to 87.5% in group I. More of the WRLP group III participants were female than in other groups. The percentage of participants with children ranged from 69% in group III to 75% in group I. The minimum and maximum age of participants ranged from 26 to 52.

The number of participants who had completed college or a higher level of education varied somewhat; group I had the lowest percentage (66.6%) and group II had the highest percentage (80%).

The greatest number of participants household income level ranged from $ 15,000-44,999. Within Groups I-III, 7-9% of participants had incomes below $ 15,000. Incomes above $ 50,000 were reported by 26-36% of each group. Average annual household income of the WRLP-alumni rural leaders ($30,081) was higher than state ($29, 442), and non-metro counties ($24, 356) and lower than metropolitan counties ($33, 018).

Geographic Distribution of Participants

The program is a state wide effort in rural leadership development. Forty five out of 71 counties have had participants in the WRLP; seven counties contributed 37% of the participants; thirty eight counties contributed 63% of participants; and 26 counties did not have any participants. Out of nineteen metropolitan counties, fifteen counties were covered under the WRLP. Four metro counties (Douglas, La Crosse, Racine, and Sheboygan) have not participated in the program. The counties without any participation were generally in the northern and southwestern part of Wisconsin. Nearly 75 percent of the metro counties and 58 percent of nonmetro counties were covered within Groups I-IV of WRLP.

I. Impact on Rural Leaders Capacities

A. Understanding of Public Issues:

Table 1 indicates the modal level of participant's increase in understanding of national, state and local community issues attributable to WRLP was moderate among all groups. Thirty-five and 52.7 percent of the respondents reported a major increase in understanding of public issues at the state and international levels respectively. Similar results were reported for increase in understanding of relationships of issues and of operations of government across the local, state, national different geographic scale. Overall, increases in understanding of international issues rated the highest (mean 2.35) and of local community issues rated lowest(1.88 mean).

B. Perspective Changes on Public Issues:

A range from 13.6-33.6 percent experienced major changes in views on public issues, leadership roles in society, role of volunteer organization (including political parties), functioning of a democratic, pluralistic society, their concept of community and who and what is important to them. On the other hand, 38-40% of the respondents reported that WRLP contributed to little or no change in their views on the role of volunteers and of the nature of democratic society. Overall the highest mean changes occurred with respect to views on the concept of community (Mean=2.15) and leadership role in society (Mean=2.13). The lowest levels of change occurred for views on voluntary and political organizations (1.71) and views on democratic, pluralistic society (1.79).

C: Changes in Personal Capacities (Attitudes, Abilities and Practices)

Table 2, indicates that sixty percent or more of the respondents reported WRLP contributed to a moderate to major increase in nearly every personal capacity. The greatest percentage reported these changes in three areas: sense that they can make a difference (78.2%), belief and confidence in self (77.3%), and skill in analyzing problems and alternatives (73.6%). Areas where a substantive percentage claimed little or no effect were: ability to speak effectively in public (43.6%), skill in handling conflict

(37.3%) awareness of values and beliefs (33.7%), awareness of life priorities (35.4 %) and commitment to life priorities (35.4%). None of the items had any notable number of respondents who viewed the program as contributing to a decrease in their personal capacities.

D. Organizational Capacities:

Nearly two-thirds of the respondents reported either no effect or little positive effect in strain and tension with other community leaders (70.9%), number of organizations to which they belong (69%) and organizations in which they were active (61.8%). On the other hand, networking with other activists and leaders (70%), and skill in developing effective groups or teams (57.3%) were reported under the category of moderate to major increase attributable to WRLP.

E. Changes in Public Affairs Capacities and Efforts:

The results regarding overall public affairs capacities and efforts of participants are presented in Table 3. A substantive share of the respondents said WRLP had no effect on active involvement in public issues at the international level (59.1%) and at the national level (43.6%).

On six items a range of 64 to 81 percent reported a moderate to major positive effect on their capacities in and attention they pay to public affairs. 1. attention they pay to state level public issues (68.2%), 2. quality of their decisions in public affairs (67.3%), 3. attention to issues at the international level (69.1%), 4. attention to issues at the national level (63.6%), 5. breadth of rural leaders interest in a variety of public problems and issues (80.9%), and 6. confidence in participating in public affairs (65.5%).

The highest mean increase was reported for breath of leaders interest in a variety of public problems and issues (2.13). Active involvement of leaders in public issues at the international level recorded the lowest mean increase (0.58).

F. Changes in Personal, Professional and Family Life:

In the case of changes in personal, professional and family life, the primary impact that the participants attributed to their WRLP experiences are an increase in the quality of their career, business or professional life (66.4% moderate or major), quality of their aesthetic, cultural, recreational and, or spiritual life (52.8% moderate or major), and amount of travel in their life (51.6% moderate or major). However, 61.8% of rural leaders reported little increase or no effect on quality of their family life.

II. Community Level Accomplishments

G. Rural Leader's Accomplishments (Local and Beyond Community)

This part of the investigation was aimed at finding out the extent of WRLP participants accomplishments at the local community level and beyond their community level (e.g., area, state, national and international), accomplishments in which they played a significant role that had occurred since they began participating in WRLP. Over half of the WRLP alumni in most groups reported accomplishments both within and beyond their community level. Members of group II were most likely to report accomplishments beyond the community level. There was considerable variation in the expression of WRLP alumni accomplishments from group to group in areas of business, school, environmental issues, health, agriculture, economic development, policy, international marketing, strategic planning, history, tax reform, communication, politics, tourism development, and fund raising activities. However, over 41% of the respondents stated that they were not able to report any accomplishment either within the local or beyond community level due to their commitments to work, profession and family development.

H. Enhancing Other People's Community Involvement and Leadership Capabilities

The following part provides an examination of two components: The WRLP leaders' efforts to involve other people in addressing community/public concerns and enhancing the community/public affairs leadership capabilities of other people. As can be seen in the Tables 4-A and B, most leaders (63-96%) reported efforts to involve others in community-public concerns and to develop leadership capabilities of others in the following areas: encouraging others to run for public office and school board, motivating people to participate in WRLP, attempted to empower rural citizens to do what they want to do in their own way, involved people in government issues, encouraged local volunterism through "united way", urged and motivated people to express their own/community concerns to legislator and congress men, and other developmental activities in the areas of agriculture, community and economic development etc. Members of Group I were most likely to report efforts in these areas. Over 22% of the rural leaders were not involved in the above activities due to lack of time.

I. Value and Satisfaction with WRLP:

Rural leaders were asked to record their overall views of the WRLP's value to the future of rural Wisconsin and their satisfaction with the program using a 5 point scale (5 = "Very High" to 1 = "Very Low"). Participants overall satisfaction with the program and the value of the program for the future of rural Wisconsin were rated "High to Very High" (mean 4.56 and 4.23) respectively.

J. Positive Elements of the Program:

Respondents were asked to provide their perception of the positive elements of the program using an open ended question. An exposure to complex issues, meeting diversified people, networking systems and coalition building, stimulated active participation in free trade with other countries, an opportunity to interact with top state leaders, self-confidence, and learning opportunity about working systems of the government, community and political organizations were viewed as highest positive elements of the program.

III. Factors Affecting Program Participants

K: Missing Elements:

A leadership development experience of this nature does not come without its limitations. Participants were asked, "Have there been any 'missing or underemphasized' factors in WRLP that could have significantly enhanced or supported rural leaders subsequent development and performance"?

Concerns expressed were understanding of diversity and cultural enlightenment within program (e,g., native American, black culture and their involvement), mentor program to alumni, personal self development within the program, not enough emphasis on agriculture and environmental issues, entrepreneurs issues and advanced training on public affairs leadership processes (how to speak and present issues in public, how to lead in community and state issues, how to run campaign or groups, how to share resource materials with other agencies and groups, how to formulate better questions related to public issues, how sources of tax distributed, how to deal with media to solve community issues and how to read public groups), spouse involvement and family management, understanding of leadership role by spouse, time management, and a variety of human relations concerns.

L. Design of Program

Nearly 75 percent of the participants were highly satisfied with present mission, goal and design of the program. However, suggestions were expressed by 25 percent of the participants. They included redesign the program to pursue diversity and ethics and to increase representation of northern Wisconsin, change the intensity of seminar time period (from 2 yrs to 1 or 3), increase proportion of women as compared to men, expand communication systems for networking among alumni and program, focus on agriculture, rural issues, international trade and its applicability to local settings.

M. Alumni Association Activities:

This part examines WRLP alumni participation dimensions, their views about the alumni association and its activities and what programs or activities leaders would like the association to conduct or support. As can be seen in the Table 5, nearly 73 percent of respondents were involved and 27 percent not involved in the alumni activities. Only 10 percent of the people had major involvement since completing the two year WRLP. The major reason expressed for not being involved in alumni activity is lack of time, spouse support, and motivation from the alumni association.

Conclusion

WRLP increased rural leaders understanding of public issues most in the international arena, the national arena and the government arena. The program contributed most to changes in rural leaders views and perspectives regarding their concept of community and of leadership roles in society, and in the quality of their career, business, or professional life, in the amount of travel in their life, and in the quality of their aesthetic, cultural, recreational and, or spiritual life. Lack of diversified culture and ethnicity was considered the least beneficial aspect of the program. Concerns expressed by rural leaders regarding their participation in the program included lack of time, lack of experience on how to speak and present issues in public and a variety of human relation issues. Overall, the value of WRLP to the future of rural Wisconsin and rural leader's satisfaction with the program was rated "high to very high".

EDUCATIONAL IMPORTANCE

This paper has a number of implications to advance general knowledge and theory about rural leadership education for the 21st century and about institutionalization for rural leadership education in order to empower rural citizens decision making processes both in the United States and abroad. For most people in the world, direct experience with other countries and culture is infrequent or nonexistent. Even in the U.S., with its geographically mobile society, there is a tendency to stay within our own communities and circle of acquaintance (Ludwing 1993). Contemporary people learn about their world primarily through information systems. The media, coupled with experiences, socialization, and nonfromal and formal educational systems all contribute to an individual's global perspectives -- a blend of many things that shape how an individual views and interacts with their world.

WRLP prides itself on developing an internationalized curriculum and educational programs in response to the needs and interest of rural leaders to deal with complex issues impacting rural life in the U.S and abroad. Cooperative Extension should begin to educate staff, clients and administration regarding global issues and the many interrelationships which exist. This paper documented goals for integrating international perspectives into Extension programs and reaffirmed the importance of global competency for Extension staff, clients and leaders.

Finally, a word about the limitations of the program. For instance, the WRLP increased rural leaders understanding of public issues most in the international arena, but active involvement of leaders in public issues at the international level recorded the lowest level. Further the extent to which the knowledge and skills learned in abroad are being used for the benefit of the local community and why rural leaders do or do not participate in WRLP are areas of further study. Leadership development practitioners and researchers in all countries are urged to examine the expanding base of rural leadership programs in order to strengthen the vital practice of community and public affairs leadership development.

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Table 1 Understanding of Public issues
{Responses are presented in percentage (N=110)}

	Decrease			No	Increase			
	Maj	Mod.	Little	effect	Little	Mod.	Major	Mean
Scale	-3	-2	-1	0	1	2	3	
A. Understanding of local community issues	0	0.9	0	8.2	16.4	50.0	24.5	1.88
B. Understanding state issues	0.9	0	0	0	11.8	52.7	34.5	2.18
C. Understanding of national issues	0.9	0	0	2.7	12.7	54.5	29.1	2.06
D. Understanding of international issues	0.9	0	0	1.8	10.0	34.5	52.7	2.35
E. Understanding of relationships of local, state, national, and international issues	1	0	0	1.8	14.8	48.2	34.5	2.12
F. Understanding of operations of local, state, and national levels of government	0.9	0	0	1.8	12.7	44.5	40.0	2.19

Table 2, Personal Capacities of Participants

	Decrease			No	Increase			Mean
	Maj.	Mod.	Little	effect	Little	Mod.	Major	Rating
Scale	-3	-2	-1	0	1	2	3	
A. Belief and confidence in myself	0.9	0	0.9	4.5	16.4	48.2	29.1	1.96
B. Awareness of my values and beliefs	0	0	0	8.2	25.5	40.9	25.5	1.84
C. Awareness of my life priorities	0	0.9	0.9	10.9	24.5	36.4	26.4	1.74
D. Commitment to my life priorities	0	0	1.8	13.6	21.8	47.3	15.5	1.61
E. Sense that I can make a difference	0.9	0	1.8	1.8	17.3	47.3	30.9	2.00
F. Skill in analyzing problems and alternatives	0	0	0	2.7	23.6	42.7	30.9	2.02
G. Skill in handling conflict at interpersonal, group, organization or broader levels	0	0	0	9.1	28.2	42.7	20.0	1.74
H. Ability to speak effectively in public	0.9	0	0	11.8	31.8	37.3	18.2	1.60

Table 3, Changes in Participants Public Affairs Capacities and Efforts
(Responses are in Percentage)

	Decrease			No		Increase		
	Maj.	Mod.	Little	effect	Little	Mode.	Major	Mean
Scale	-3	-2	-1	0	1	2	3	
A. Willingness in organizations in which I belong to engage in policy discussions	0	1.8	0	6.4	33.6	38.2	20.0	1.66
B. Willingness in personal interactions to engage in discussions of public affairs	0	0.9	0	9.1	29.1	34.5	26.4	1.75
C. Breadth of my interest in a variety of public problems and issues	0	0.9	0.9	3.6	13.6	40.9	40.0	2.13
D. Concentration on selected public problems and issues	0	0	0.9	20.9	31.8	36.4	10.0	1.34
E. Confidence in participating in public affairs	0.9	0	0	4.5	29.1	39.1	26.4	1.84
F. Efforts to involve others in public affairs	0	0	0.9	19.1	31.8	37.3	10.9	1.38
G. Quality of my decisions in public affairs	0	0	0	10.0	22.7	49.1	18.2	1.75
H. Attention I pay to community and public affairs at the local level	0	0	0	10.9	18.2	51.8	19.1	1.79
I. Active involvement in community and public affairs at the local level	0	0.9	2.7	20.0	45.5	22.7	8.2	1.11
J. Attention I pay to state level public issues	0	0	0	6.4	25.5	51.8	16.4	1.78
K. Active involvement in public issues at the state level	0	0.9	0	28.2	39.1	20.9	10.9	1.12
L. Attention I pay to public issues at the national level	0	0	0	7.3	29.1	41.8	21.8	1.78
M. Active involvement in public issues at the national level	0	0	0	43.6	36.4	16.4	3.6	0.80
N. Attention I pay to public issues at the international level	0	0	0	6.4	24.5	43.6	25.5	1.88
O. Active involvement in public issues at the international level	0	0	0	59.1	27.3	10.0	3.6	0.58

TABLE 4 - A. INVOLVED OTHER PEOPLE IN COMMUNITY-PUBLIC CONCERNS

RESPONSES			**YES**		**NO**			
Groups	*GI*	*GII*	*GIII*	*GIV*	*GI*	*GII*	*GIII*	*GIV*
(N)	**23**	**21**	**21**	**25**	**1**	**4**	**6**	**4**
Percentage	**96**	**84**	**77.8**	**82.2**	**4.2**	**16**	**22.2**	**13.8**

TABLE 4 - B. ENHANCED OTHER PEOPLE'S COMMUNITY INVOLVEMENT AND LEADERSHIP CAPABILITIES

RESPONSES			**YES**		**NO**			
Groups	*GI*	*GII*	*GIII*	*GIV*	*GI*	*GII*	*GIII*	*GIV*
(N)	**23**	**21**	**17**	**23**	**2**	**4**	**10**	**6**
Percentage	**96**	**84**	**63**	**79.3**	**8.3**	**16**	**37**	**20.7**

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Table 5. How active have rural leaders been in WRLP Alumni activities?

	Not Involved	*Little Involvement*	*Some Involvement*	*Moderate Involvement*	*Major Involvement*
(N105)	**(28)**	**(31)**	**(27)**	**(8)**	**(11)**
Responses	**26.7%**	**29.5%**	**25.7%**	**7.6%**	**10.5%**

The University's Role in Agricultural Development: The Missing Links

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Introduction

Teaching, research and community service to promote rural development are the key missions of the Universidade de Trás-os-Monte e Alto Douro (UTAD). However, the performance in these three areas are quite distinct and in the case of agriculture and rural development, several issues have been raised, for example, one major question concerns the relationship between university research and agricultural extension or transfer which is under the responsibility of the Regional Directorate for Agriculture in the Trás-os-Montes Region. Other issues are related to the integration of local or indigenous knowledge with university research projects.

Methods and Data Sources

The paper uses data collected in 1993 from interviews with representatives of regional institutions, as well as information from a survey of researchers. It also draws from material collected during a workshop held in the summer of 1993 on inter-institutional linkages and rural development. This data was collected within a framework which used "rapid appraisal of the agricultural knowledge system"(Engel et al., 1990).

More specifically, the paper will critique the intergroup relationships between primarily the Regional Directorate, the university located in the region, UTAD and the potential users in the agricultural knowledge and information system. The qualitative analysis will be based upon interviews with key actors in these institutions, a formal questionnaire sent to agricultural scientists within UTAD and a meeting between actors within the above mentioned institutions and other regional development agencies byway of a workshop which borrowed somewhat on the nominal group technique. Unfortunately, many key actors from UTAD and the Regional Directorate were not present at the workshop, but were interviewed prior to the workshop. The interviews, questionnaires and interactive group results will be used to describe and critique the inter-institutional linkages between the major institutions involved in the the generation and transfer of technology.

The study will not describe the farm-level constraints surrounding the generation and transfer of agricultural technology or identify the process used for modification of any technology (farm machinery or food processing) to fit a certain agri/socio economic condition within a particular ecological niche. The intergroup or inter-institutional relationships to be discussed should be considered as one aspect of the effectiveness of the generation and transfer of technology as it is associated to the agricultural knowledge and information system. A more global appraisal which includes other aspects or constraints in effective linkages between the users and the generation and transfer institutions such as availability and relevance of technologies, quality and availability of resources, constraints in adoption/diffusion process will not be addressed in this paper. It is limited to the description of relationships between the major institutions and players.

Generation and Transfer of Technology within the Region

The Regional Directorate is the major player in the transfer of technology in the region. However, they are also involved in young farmer training in a region where the majority of young farmers have an education level quite low in comparison to the experience in the United States. In a descriptive study by Koehnen and Alves, 1992, in the area of Barroso within Trás-os-Montes region, the majority of young farmers had 4 years of education. With the educational level in mind, the farmer training programs by the directorate are somewhat linked to the transfer of knowledge and technology in such areas as plant and animal production, farm accounting where it had not existed before, leadership, the management of farm cooperatives and associations (since 1986) among other themes. It needs to be understood that prior to the young farmer training by Regional Directorate, the young farmers have had limited or no formal agricultural educational training. The Regional Directorate is also involved in the promotion of farmer organizations and animal health and sanitation associations. They are also involved in many regulatory processes, because of their association to farmers, farmer associations and the local governmental agencies.

The Regional Directorates minor role in adaptive research involves the agri-ecological systems, integrated pest management and within the social science the specific functioning of commodity storage cooperatives, small society membership groups of farmers cooperating in production niches etc. Trás-os-Montes has a lot of tree and vine crops, and a mixed cropping system with ruminants such as sheep, goat and cattle. They have little responsibility with plant and animal breeding research areas (this is more the responsibility of UTAD). But it is true that the Regional Directorate is involved in the adaptive research in areas of crop production and even a bit in the social sciences. A critique of their adaptive research would be that there is limited published reports concerning the work carried out at the research stations.

The UTAD was created in 1986, succeeding the University Institute with the same designation and the Polytechnic Institute of Vila Real, created in 1973 after a major reform in the higher educational system. It is a center of learning and research and an important pole of development for the area. UTAD is presently organized in three major scientific and pedagogical areas - Agricultural Sciences, Social Sciences and Humanities and Exact, Natural and Technological Sciences. Each of these areas includes a number of departments, presently a total of eighteen.

There are six Master's Degree involving technicians and researchers from regional institutions. The degree programs fall within Extension and Rural Development; Agriculture, Environment and Markets; Horticulture and Viticulture; two degrees in the Forestry Sector, and Animal Production. These graduate programs have the potential to augment the number of research projects for UTAD.

Concerning research, UTAD is involved in numerous applied research projects, all of them with a strong regional emphasis, and most of them dealing with the agri-business sector. Some research areas that are funded by outside funding agencies are: the environmental impact of heavy metals in Portuguese soils; micro-propagation of grape vine stock; characterization of the micro-flora involved in the process of traditional sausages: IN VITRO selection of wheat and triticale tolerant to aluminum; digestible and efficient factors for ruminant utilization of fibrous feed; integrated pest management; loss of nitrogen in forage crops of intensive dairy operations; among others.

It should be noted that the participation of the University in earlier projects such as the "Integrated Rural Development Project of Trás-os-Montes" funded by the World Bank, made it responsible for implementing an agricultural applied research program with a partnership with the Regional Directorate.

In some sense, the early establishment of UTAD and even the Regional Directorate was influenced by external donors such as USAID, World Bank and others from Europe. These donors determined in some extent a degree of cooperation between the agricultural research and transfer institutions. Agricultural policies and the inter-institutional linkages have been influenced by the control and distribution of resources by the donors. During this period, the cooperation between institutions might have been more effective than today.

Weaknesses of Inter and Intra-Institutional Relationships

The norm for inter and intra-institutional relationships according to Bennel, 1989 should be cooperative-collaborative or even competitive-collaborative relationships, but some of the discussions and interviews indicate something resembling the conflictual-avoidance relationship associated with negative feelings toward one sector or another, or the groups avoid interacting with each other. This in general is what one discovers through the qualitative research endeavor. And one finds out through observation and interviews that the farmers and especially the low resource farmers are often formally left out of the loop. "Generally speaking, there is an ascending 'hierarchy of status' which goes from farmer to extensionist to researcher" (Bennel, p.12,, 1989). Now link this to young farmers with low educational levels and rather new involvement in farmers' associations and organizations and you have a general description of the farmer relationship/involvement in the generation and transfer of technology scheme in Trás-os-Montes.

> "Farmers organizations tend to be more influential when their members are relatively well educated and enjoy access to resources which help them absorb the risks of innovation" (Sims and Leonard, p. 18, 1989).

Besides the lack of farmer influence or lobbying skills, there was limited inclination by the scientists to promote farmer involvement in the research endeavor. In some sense, it is true within UTAD that, "Scientists research methods traditionally exclude clients from formulating the problems and contributing to their solutions" (Sims and Leonard, 1989,p. 7). The UTAD scientists are influenced more by the fact that in order to advance in their career, they need to publish in scientific journals. Normally as was also pointed out by Sims and Leonard, 1989 a scientist requires recognition by their peers through publications which occurs within select research areas. At UTAD these select research areas have little to do with the problems of small scale producers in Trás-os-Montes region.

In some small way, the governmental policy to promote farmer associations and cooperatives in the transfer of technology as well as the young farmer training programs by the Regional Directorate involving courses in *associativismo* attempts to improve the position of the farmer. The policies and training programs are an initiative to increase farmer involvement in applied research. "The importance of farmers' organizations is that they directly represent the users of agricultural research. To the extent that they will demand relevant research, press for the integration of research and technology transfer, and, as a consequence, promote adoption to a greater degree than do any other actors in the political or bureaucratic system" (Sims and Leonard, 1989, 17). The present situation in Trás-os-Montes is more linked to accepting or not accepting what is offered by the generation and transfer scheme. It is not a "demand driven" system.

Interestingly, it was pointed out by one influential scientists at UTAD that he had substantial contacts with a farmer association in the north although outside of Trás-os-Montes region, because of their direct linkage to him. They came to the UTAD campus to request his assistance and they represented a modern group of agriculturists. However, even this situation is still a rarity in the Trás-os-Montes region. The Trás-os-Montes cooperatives and associations are not at this level. They are still being maintained and promoted by the Regional Directorate.

Besides the "publish or perish" perspective by the UTAD scientists, they were also in some respects concerned with the lack of equipment and laboratory facilities. In some respect the UTAD being a young institution drove those seeking research funds to focus their research on the projects which assisted them to build an adequate research facility. Unfortunately, this preoccupation also limited the focus on the targeted groups' constraints and problems.

A questionnaire that was sent to 14 agricultural scientists at UTAD and responded by nine will corroborate the lack of contacts or linkages with agriculturists who were targeted for their research programs. With the nine responses from the UTAD group, it was determined that two in nine or 22% of these scientists involved the target group in the research process. And of these two, one involved them informally by locating the experiments on the farm as a type of on-farm research. This particular study was linked to an earlier World Bank project.

Six out of nine or 67% of the scientists pointed out that their research projects were at least linked to a target population in the region, but the farmers were not formally involved in the research endeavor. (Please note that the sample had no follow-up of those who did not respond.)

In a region that had poor infra-structure, the inter group contact and communication was somewhat limited between the Directorate and the major research group (UTAD), because of the distance between the headquarters of UTAD and the Regional Directorate (Vila Real and Mirandela). This situation is improving because of the improvement in the road and communication infra-structure. Another problem cited for poor relationships was the higher staff turnover at Mirandela which was pointed out by staff interviewed at UTAD. This attrition of personnel made it difficult to maintain continuity in the joint breeding research program. These were some reasons for a lack of contacts as pointed out by an element within the Regional Directorate and scientists at UTAD.

Evidently, there were weak direct linkages to the farmer in the research programs identified by the survey. It is also evident that the formal inter-institutional linkages between UTAD and the Regional Directorate can be improved. In some sense, one can infer implicitly from the interviews and observations that the major institutions are more in conflictual-avoidance mode than cooperative-competitive. The reasons for this mode were never explicitly identified. but correlate to the factors advance by Bennel. "The factors that dissuade groups from co-operating with one another include the bureaucratic time involved, the risk that co-operation will fail, the lack of symmetrical gains in interdependent ventures, higher vulnerability to attack as a result of increased organizational visibility, and a desire to preserve a particular identity or status" (Bennel, p. 11, 1989).

Whatever the explicit reason for the conflictual-avoidance mode between the Regional Directorate and UTAD, the responses to the questionnaire at the first glance appear not to corroborate our observation, but on closer inspection one discovers otherwise. The responses to the questionnaire indicated that five of nine (56%) UTAD scientists had linkages to the Regional Directorate, but often times the linkages were informal. In these five, two of the scientists described research projects that occurred during an earlier World Bank project (Integrated Rural Development Project of Trás-os-Montes). It is also interesting to note that two of the nine had no inter-institutional linkages with any other institution outside UTAD. The interpretation is that there is more of a conflictual-avoidance mode than the cooperative-competitive viewpoint between the two institutions.

The perspective toward inter-institutional relationships between UTAD and the Regional Directorate are weak or cool/luke warm . The formal mechanisms established during the earlier World Bank project appear to be discontinued. When we interviewed elements within the Regional Directorate and the UTAD, they referred to inter-institutional meetings between the two institutions which are not as frequent as during the "Integrated Rural Development Project of Trás-os-Montes". These cool inter-institutional relationships between actors are one representation to the problems associated to the generation and transfer of technology. As was stated earlier, this paper will describe only one facet to the problems involving the generation and transfer of technology. In our opinion, the inter group relationship today can be attributed more to the following situation.

Some of the scientists interviewed at UTAD hinted at a possible misperception concerning the generation and transfer of the technology process. They had the idea that there efforts would contribute more to the global process than the institution with the responsibility to transfer technology. The belief is linked to the following idea, " (they) alternatively have dismissed the role of technology transfer institutions in the belief that 'good technology sells itself '" (Bennel, p. 12, 1989). One can be more descriptive as to misperceptions of groups within the UTAD and Regional Directorate through the corroboration of the following statements.

> "In such groups there is a marked overestimation of in-group achievements and underestimation of out-group achievements. Misperceptions and misunderstandings play an important part in the development of competition. Members of one group think that they understand perfectly the other group's position, when in fact they do not" "Consequently inter group competition for power often manifests itself as conflict over functional responsibilities. However, the desire of one group to take over some of the functions of another group may also be motivated by the conviction that the

> second group is not performing those functions satisfactorily. This is often the case between research and extension" (Bennel, p. 11 and 12, 1989).

The objective of this section was to describe the role of university researchers, extension workers and policy makers involving the inter-institutional relationships, particularly as they are related to agricultural and rural development. It addresses the specific case of Trás-os-Montes, northeastern Portugal, where the regional institutional potential is quite significant, and yet the inter-institutional linkages are quite weak. The University located in the region has been challenged to have a more active role in the development process, but several missing links constitute important obstacles to the full growth and maturation of its roles.

Improving Inter-Institutional Linkages

In some sense to improve the inter-institutional linkages, it is necessary to formulate a regional agricultural policy which is directed more to the situation within the Trás-os-Montes region. The national policy needs greater adjustment to a mountainous region where the less modern agriculturists are not as vocal as in other regions. "This is often attributable to an unstated lack of government commitment to agricultural development, coupled with the inability of agricultural producers, in particular smallholder subsistence farmers to put sufficient pressure on research and extension to ensure collaboration. Furthermore, when agricultural development policies are only broadly stated, there is considerable scope for research and extension to interpret these as they wish so that, in practice, each group's goals are not only significantly different but may, in fact, be incompatible" (Bennel, p.13-14, 1989).

The agriculturalist need to play a greater role in the generation and transfer process. In order for this to take place, the inter-institutional linkages need to be improved and maintained. Kaimowitz et al provided a complete list of formal and informal mechanisms which can be used to improve the inter-institutional relationships between the major actors. A further description will follow of a more specific integration of a participatory conceptual framework. In any case, the paper by Kaimowitz et al. gives us a more global overview of linkage mechanisms to improve the inter-institutional linkages.

> "Formal linkage mechanisms which are mentioned in the literature include: committees, task forces, liaison departments and officers, subject-matter specialists, agricultural communication units, pre-extension units, the contracting of research by development agencies, farming systems programs, joint activities, publications, presentations and demonstrations, staff exchanges, inter-agency agreements, service provision, joint plans, matrix management, shared supervisors, policy mandates, and meetings.
>
> Informal mechanisms consist of communication and the exchange of resources without official sanction or through personal contacts. Communication studies have found that people who maintain personal contacts beyond their unit play a key role in inter-unit exchanges of information" (Kaimowitz et al, p. 5, 1989).

In the inter-institutional relationships between UTAD, the Regional Directorate and the farmer groups, there has been identified many constraints. It is obvious that greater farmer interaction with generation and transfer is necessary. A farmer participatory philosophy should be incorporated into the technology generation scheme. "The farmer participatory transfer of technology philosophy must be strongly interactive with both a cyclic and two-way communication process among and with the many institutions (good communication linkages within the institutions as well) and actors in the system" (Koehnen, p.3, 1993).

An additional mechanism to be highlighted which can improve the linkages between the institutions would be the "subject matter specialist" that should be shared and financed equally by UTAD and the Regional Directorate. The role of the subject matter specialist is critical in the overall process of improving the inter-institutional linkages. He or she serves as the go-between or the actor that links extension to the research domain (the domain being interpreted as the involvement of the farmer or cooperatives). This actor plays the role of an extensionist and an agricultural researcher. The subject matter specialist needs to communicate effectively with farmers, extensionists and agricultural researchers.

More specifically, some of the characteristics and competencies of the subject matter specialist could be:

1. lead on farm trials to maintain productivity, stability and sustain ability of the whole farm system.

2. collaborate with other scientists (interdisciplinary) to understand the interactions of various factors in farming system as well as the human component.

3. provide visionary leadership in the development of inter-disciplinary research.

4. co-ordinate program diffusion and dissemination among all the actors in the system such as farmers, extensionists, input houses and researchers through educational programs which use extension methodologies and materials while integrating with extension communication units.

5. promote participation of the farmers in the process of assessing and understanding their agricultural system and constraints through a mutual learning process.

The subject matter specialist is one of the actors in the global system, but it should be emphasized that all actors including the farmers have an equal responsibility for the improvement of inter-institutional relationships. The "demand driven" aspect of the generation and transfer of technology requires not only improvement in the inter-institutional relationships, but considerations in the effectiveness of the paradigm outside social relationships.

Conclusions

In this qualitative research endeavor, an interactive or action formula has assisted us in learning about the strengths and weaknesses of the role a regional university plays in inter-institutional linkages. The paper should be considered a catalyst to increase the dialogue about rural development in the case of Trás-os-Montes as well as serve as a source for discussion about our framework's potential in other studies.

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Session M MANAGEMENT OF EXTENSION

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   Ismail E. Mohamed
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Educational Needs of International Graduate Students of Extension Education: Their Perceptions compared to Those of Extension Educators in the United State

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Julia A. Gamon — Associate Professor
Larry D. Trede — Professor
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Introduction

In contemplating the nature of preparation required of extension professionals, two serious questions have always confronted researchers, administrators, and practitioners: what are the tasks that an extension professional performs? And what is the nature of the training that should be provided to those who wish to perform these tasks? The entire theory and practice of extension education, as currently conceived, appear to hinge on the ability of the professional to seek new modes for understanding and responding to opportunities for assisting their clients (Lawarence et al., 1973).

Many Third World countries send students to the United States to gain new knowledge, learn new skills, and adopt new practices to better serve their countries. The number of the international graduate students in the United States colleges and universities shows that it has exceeded 400,000 for the first time (Open Doors, 1991). According to Thummel et al. (1982), at least 244 students from 44 nations were enrolled in agricultural education departments during 1978/1979. Mohamed (1994) reported that there were 128 international graduate students of extension education from 44 nations in the United states in 1992. Although graduate faculty in these departments are regularly challenged to translate their perceptions of educational needs of international graduate students into appropriate educational activities, identifying and describing these needs remains a problem (Timko et al., 1991). A two-way communication between students and those who teach them is necessary so that needs, interests, and expectations of students are clear to teachers and vice versa (Thummel et al.,1982).

What is known today about the teaching and learning process all points to the necessity of identifying the needs of learners as a necessary condition for effective training. Both educators and international students perceptions of needs of students were investigated by Thummel et al. (1982); Kouzekanani (1983); and Timko et al. (1991). Some of the suggestions for graduate programs in extension education have been the following: more in-country training, and training methods and programs that are more attuned to less-developed countries and progress needed there (Thummel et al., 1982).

Purpose

This study documented perceptions of extension educators and international graduate students of extension education in the United States toward some of the educational needs of international graduate students. Also the study described groups' demographics, relationships between perceptions and demographics, and associations between groups' demographics and perceptions.

Methodology

The framework of this study consisted of 33 universities in the United States. The schools reported as of Fall 1992 that there were 96 extension educators and 128 international graduate students. The survey instrument included twenty-eight items that were related to the educational needs of international graduate students of extension education. Two indicators were used to measure the perceived training needs. The first was the perceived training needed for each item and the second was the perceived importance for the same item. Separate instructions were given in this part for each of the two groups.

A panel of five experts assessed the instrument for instructions, item content, and validity of the scales used. The instrument was pilot teste at Iowa State University. The first mailing of the instrument brought 73 completed questionnaires from extension educators

(76%) and 68 from international graduate students (53.1%). The total response from both groups in the first mailing was 141 (62.9%). The follow-up resulted in additional 10 completed surveys from the educators and 8 from the students for a total response of 159 (70.9%). An appropriate follow-up procedure that compared non-respondents with respondents found no differences.

Reliability, frequencies, measures of dispersion, Spearman correlation coefficient (rho), factor analysis, and analysis of variance were employed to analyze the data.

Results and Conclusions

Cronbach's Alpha coefficients for the need and importance scales in this part were ..90, and .90 respectively. Findings of this study indicated that the typical extension educator in the United States was a 48 year-old man who was a full professor, had about 25 years of total work experience, 16 years of extension work experience, taught extension education courses for about nine years, acquired some kind of international work experience, and teaching in school in the southern region of the United States. The study also showed that the typical international graduate student studying in the United States was a 35 year-old, African, doctoral male student, who had about five years of extension work experience, received a bachelor's degree at his home country, a master's in the United States, spent about three years studying in the United States, and was studying in school in the north central region of the United States.

Tables 1 and 2 summarize extension educator and international graduate student responses to the felt need for and importance of twenty-eight training items. Both educators and international students perceived that all the twenty-eight training items were needed by international students and important to be included in curricula intended for them. According to the data items that were rated highest in terms of need and importance by extension educators and international students included: 1) program planning, 2) program evaluation, and 3) needs assessment. Items that were rated lowest by both groups in terms of felt need and importance included: 1) history of the Cooperative Extension, and 2) application of computers in educational settings.

The data of Table 1 and 2 indicated significant differences in educators' and international students' ratings of the felt need and importance of ten out of twenty-eight items. Educators' mean scores were significantly lower than those of international students on the items: 1) research methodology, 2) statistical methods, 3) administration, 4) agricultural extension in the Third World, 5) impact of technology on family, 6) rural development issues, 7) application of computers in educational settings, 8) concepts and theories in rural sociology, and 9) technology and social change in the Third World. However, educators' mean score was significantly higher on the item, teaching methods. In spite of these differences in the mean scores, the magnitude of the Spearman correlation coefficients (rho) for the ranks of the means in Table 1 and Table 2 were .68. and .77 respectively. These coefficients indicated a substantial degree of agreement on the ranks of the mean of the twenty-eight training items in terms of the felt need and importance by the two groups.

Factor analysis was employed to simplify the dependent variables. Training needs items were grouped under eight factor indices. The factor indices were handled as a set of a multiple dependent variables in the analysis of variance. Analysis of variance data indicated that educators with longer years of total work experiences felt less the need for and importance of the factor index "teaching and learning process" for international students. However, educators with longer years of extension work experiences felt more the need for international students to have training on the same factor index. The data also showed that older educators felt less the need for international student training on the factor index "technology and social system."

Table 1. Perceived importance of the selected skills and training items as reported by extension educators and international graduate students

Selected skills and training items	Overall rating (n=159) Mean S.D.	Rank	Extension educators (n=83) Mean S.D.	Rank	International students (n=76) Mean S.D.	Rank	T-value	α-tail probability
Research methodology	4.16 0.92	8	3.81 0.90	15	4.52 0.80	4	5.17	.000**
Statistical methods	3.71 0.97	22	3.39 0.91	25	4.05 0.93	15	4.52	.000**
Program evaluation	4.53 0.66	2	4.49 0.71	3	4.57 0.68	3	0.81	.419
Administration	3.74 0.94	20	3.58 0.94	22	3.92 0.91	18	2.32	.022*
Program planning	4.63 0.57	1	4.61 0.56	1	4.66 0.58	1	0.49	.627
Teaching methods	4.36 0.78	4	4.51 0.66	2	4.20 0.88	9	-2.42••	.015*
Adult learning theories	4.14 0.86	9	4.15 0.81	7	4.13 0.92	12	-0.12	.905
Youth program management	3.69 0.94	23	3.66 0.90	20	3.72 0.98	26	0.38	.704
Agricultural extension in the Third World Countries	4.07 1.00	12	3.69 1.06	19	4.47 0.76	5	5.28••	.000**

Major world food issues	3.61 0.97	26	3.48 0.86	23	3.76 1.07	25	1.81	.072
Impact of technology on family	3.63 1.01	25	3.43 0.93	24	3.84 1.07	23	2.59	.010*
Rural community development issues	4.26 0.83	5	4.11 0.87	9	4.41 0.76	6	2.29	.023*
Application of computers in educational settings	3.30 1.12	27	3.01 0.95	27	3.60 1.21	27	3.35••	.001**
Concepts and theories in rural sociology	3.63 0.97	24	3.39 0.92	26	3.89 0.95	19	3.36	.001**
Communication theories and methods	4.11 0.87	10	4.11 0.81	8	4.11 0.92	13	-0.04	.967
Technology and social change in the Third World	4.01 0.86	14	3.83 0.85	14	4.20 0.82	8	2.78	.006**
Needs assessment	4.48	3	4.38	4	4.59	2	1.91	.0580.
0.70	0.72	0.66						
History of the cooperative extension	2.77 1.17	28	2.65 1.03	28	2.91 1.31	28	1.35	.178

••Separate variance estimate.

*Denotes significant differences between groups at .05 level.

**Denotes significant differences between groups at .01 level.

Spearman Correlation Coefficient rho = 0.78.

Scale: 1. Not important; 2. Somewhat important; 3. Important; 4. Very important; 5. Extremely important.

Table 2. Perceived need of the selected skills and training items as reported by extension educators and international graduate students

Selected skills and training items	Overall rating (n=159) Mean S.D.	Rank	Extension educators (n=83) Mean S.D.	Rank	International students (n=76) Mean S.D.	Rank	T-value	α-tail probability
Research methodology	4.09 0.87	10	3.82 0.76	17	4.40 0.88	4	4.30	.000**
Statistical methods	3.75 0.96	21	3.49 0.80	24	4.04 1.04	12	3.61••	.000**
Program evaluation	4.52 0.68	2	4.51 0.64	2	4.54 0.74	2	0.32	.746
Administration	3.77 0.94	20	3.62 0.90	23	3.93 0.97	16	2.02	.045*
Program planning	4.57 0.61	1	4.54 0.60	1	4.59 0.63	1	0.50	.620
Teaching methods	4.29 0.86	4	4.47 0.64	3	4.09 1.02	10	-2.71••	.008**
Adult learning theories	4.05 0.94	11	4.14 0.78	7	3.96 1.08	14	-1.16••	.246
Youth program management	3.71 0.94	22	3.76 0.85	19	3.64 1.04	26	-0.75	.452
Agricultural extension in the Third World Countries	3.97 1.03	12	3.63 1.08	22	4.36 0.82	5	4.58	.000**

Major world food issues	3.50 0.94	26	3.30 0.90	26	3.72 0.94	25	2.76	.007*
Impact of technology on family	3.58 0.99	25	3.42 0.90	25	3.76 1.06	23	2.14	.034*
Rural community development issues	4.14 0.87	6	3.99 0.91	12	4.31 0.79	6	2.31	.022*
Application of computers in educational settings	3.29 1.08	27	3.10 0.96	27	3.51 1.18	27	2.32	.022*
Concepts and theories in rural sociology	3.71 0.98	22	3.54 0.90	23	3.89 1.03	19	2.16	.033*
Communication theories and methods	4.13 0.77	7	4.14 0.73	7	4.13 0.81	9	-0.10	.921
Technology and social change in the Third World	3.91 0.93	14	3.76 0.94	19	4.07 0.90	11	2.07	.040*
Needs assessment	4.41 0.72	3	4.33 0.77	4	4.51 0.67	3	1.53	.129
History of the cooperative extension	2.83 1.16	28	2.75 0.99	28	2.92 1.32	28	0.88••	.382

••Separate variance estimate.

*Denotes significant differences between groups at .05 level.

**Denotes significant differences between groups at .01 level.

Spearman Correlation Coefficient rho = 0.68.

Scale: 1. Not needed; 2. Somewhat needed; 3. Needed; 4. Very much needed; 5. Extremely needed.

Educational importance

Although this study does not have the capacity to recommend a comprehensive proposal for a curriculum for international graduate students of extension education, all the twenty-eight training items investigated should be part of their study programs. Higher mean scores assigned by international graduate students on nine items of need and importance and significant differences between perceptions of the two groups pointed out the need for tailoring educational programs toward students' needs, interests, and aspirations. Institutions interested in developing or revising their curriculum should review the training items documented in this study and also the models suggested by other studies (Barrick, 1992).

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A REVIEW AND SYNTHESIS OF EXTENSION PROBLEMS IN AFRICA AND ASIA: STRATEGIES FOR EXTENSION ADMINISTRATORS

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INTRODUCTION

Extension services have made significant impact on agricultural development leading to self-sufficiency in food production in several countries of Africa and Asia. Despite these past efforts, there are still many constraints that limit the effectiveness of extension in effectively reaching farmers.

Several studies (Sigman & Swanson, 1984; Allo & Schwass, 1982; Rogers, 1983; and Mosher, 1978) have identified constraints related to the following nine problem areas that limit the effectiveness of extension in developing countries of Asia and Africa. Literature pertaining to the nine problems included in this study are briefly discussed in the following paragraphs.

Appropriate Technologies: *Lack of availability of appropriate technologies.* A key element of any agricultural development process is the availability of appropriate technologies to extend to the farmers. Technology is defined as the product or process of the practical application of knowledge, tools, materials, and techniques (Sigman & Swanson, 1984). Ramamurthy et al. (1985) observed that considerable emphasis has not been given to developing technologies that are simple (appropriate for the farmer's situation and resources) and low cost--two questions relate to appropriateness of technology.

To be appropriate, technologies must be suitable to the needs and requirements of farmers and should enhance the increased use of local resources such as labor. Support systems should be simple and easy to maintain and should be within the reach of a majority of farmers. In addition, risk involved should be minimum, and results should be both quick and superior to current practices.

Linkage: *Absence of a continuous two-way flow of information between the national extension organization and the national agricultural research institutions.* The importance of linkages between research and extension has been emphasized from time to time. However, past experiences indicate that there is considerable lag between research findings and their effective dissemination for adoption by the farming communities. Sigman and Swanson (1984) emphasized the need for a dynamic interaction between research and extension in order to facilitate as effective flow of research findings and feedback between these organizations.

Effectiveness of extension will be high when the extension staff fully understand research findings and are competent to demonstrate and explain them to farmers on their field (Allo & Schwass, 1982). An effective linkage between research and extension, therefore, is considered critical to the effective transfer of technology at the field level and its feedback to research stations. Every effort should be made to strengthen the linkage between extension and research because these serve as unique educational opportunities to provide information and recommendations to farmers.

Technical Training: *Field-level extension personnel lack practical skills and training about improved agricultural technology.* Training is now considered as a potential instrument for improving the knowledge and skills of both extension workers and farmers. Further, research indicates that traditional methods of imparting knowledge, efforts to change attitudes or simple capsuled courses guaranteed to eliminate problems do not always change behavior (Rao & Hanumanthappa, 1985).

Technical training generally focuses on one or more of the major areas of agriculture such as crop production, soil and water management, control of pests and diseases, and animal health problems. Several research findings indicate that extension staff should not only be trained in subject matter but also taught how to win the confidence of farm people and how to influence them in adopting appropriate technologies.

Extension Training: *Extension personnel lack training in extension methods and communication skills.* Extension methods and communication skills are the "educational tools" of Extension personnel (Sigman & Swanson, 1984). Extension methods are the means through which agricultural innovations and practices are diffused to rural clientele (Smith, 1978). The choice, combination, and use of different methods depend upon several factors such as educational level of audience, past experiences of Extension staff and farmers, size of the audience, subject matter taught, behavioral changes to be brought about, and the objectives to be achieved (Ramachandra, 1985). However, Sigman and Swanson (1984) observed that extension staff should have some theoretical knowledge of the communication process as well as practical experience in using different methods and techniques.

Mobility: *Field-level extension personnel lack adequate transportation facilities to efficiently reach farmers.* Extension workers use various modes of transportation to reach farmers. These include walking, bicycles, motorcycles and buses. Further, the type of transportation required depends to a large extent on the size of the area, and the number of farm families to be served, and the availability and condition of roads.

"How to get from one farm or demonstration site to the next is a worldwide problem in extension education" (Axinn & Thorat, 1972, p.165). This is a major problem in most countries of Africa and Asia. There are usually not enough vehicles for extension work and not enough funds to maintain existing vehicles (Blanckenburg, 1984). Further, high fuel costs have added to the problem of mobility. Rogers (1983) indicates that extension's effectiveness is directly related to the number of contacts that extension workers make with given individuals as well as the approach the workers use. Therefore, mobility is critical to Extension's effectiveness, in that, it is essential to frequently contact farmers and to conduct field work.

Equipment: *Extension personnel lack essential teaching and communication equipment.* Support for communication systems is becoming increasingly important as extension becomes increasingly recognized as a viable delivery system in countries of Africa and Asia, . However, past experiences indicate that few extension services in these countries can afford to supply every officer with equipment such as cameras, tape recorders, slide projectors, and other visual aids (Allo & Schwass, 1982).

Teaching Aids: *Extension personnel lack essential teaching aids and* *demonstration materials.* Teaching aids and materials are the "software" needed to support teaching-learning processes which are used along with "hardware" or equipment (Sigman & Swanson, 1984). Print material such as bulletins, brochures, posters, leaflets, and audio visual equipment are examples of teaching aids. Teaching aids and materials should be simple, easy to understand, inexpensive, easily acceptable and adaptable to local situations, and above all, stimulate interest and participation among farmers. Therefore, developing and providing appropriate teaching aids and materials is an absolute necessity for effective extension work.

Organization: *Diversion of extension personnel to non-extension activities.* Extension workers are frequently asked to perform duties for various governmental agencies (Sigman & Swanson, 1984). Mosher (1978) cites four such duties: collecting census data, collecting rural credit debts, "selling" a rural credit savings plan, and providing direct services rather than education. This is particularly true in India where political and religious aspects play a dominant role. However, after the introduction of the T & V system in the late 1970s, this problem is slowly disappearing. Mosher (1978) observes that if extension agents are assigned regulatory duties, their working relationships with farmers may be damaged.

Coordination: *Lack of coordination between agricultural input agencies and departments responsible for carrying out extension programs.* Coordination is an important function of management. It unifies and synchronizes the activities of different agencies towards a common goal (Veerabhadraiah & Ashok Kumar, 1985). By design, the agricultural extension service must be involved in a variety of relationships with research, training, education, and other institutions. In addition, extension works in close liaison with various departments and ministries to effectively implement agricultural and rural development programs. The lack of coordination of these programs/institutions to a large extent has hampered successful implementation of extension programs. A study on evaluation of coordination achieved in 41 block demonstrations in India revealed that a majority of the block demonstrations were in the medium and low coordination categories indicating that the coordination among the agencies involved was not good (Veerabhadraiah & Ashok Kumar, 1985).

This study is a review and synthesis of four previously completed studies on extension effectiveness in Africa and Asia. The four studies selected were: 1) Sigman and Swanson (1984) who examined extension directors around the globe; 2) Radhakrishna and Bowen (1990) who studied the perceptions of Indian extension directors; 3) Radhakrishna and Veerabhadraiah (1991) who analyzed the perceptions of principal agricultural officers in Karnataka, India; and 4) Ukaga and Radhakrishna (1992) who examined perceptions of agricultural extension officers in Imo state, Nigeria.

PURPOSE

The primary purpose of this study was to identify similarities and differences in findings of four studies that examined the effectiveness of extension in Africa and Asia. A secondary purpose was to discuss the implications of these findings for international agricultural and extension education, and suggest strategies for extension administrators to help them identify extension priorities in Africa and Asia.

METHODS AND DATA SOURCES

The data for this study were obtained from the findings of the four studies stated earlier in this report. It is important to note here that these studies examined perceptions of extension administrators at the national and international level; principal agricultural officers at the state level; and agricultural extension officers at the grass roots level. In addition, these studies were conducted in two different continents (Africa and Asia) and at different points in time. The following procedures were used to analyze the findings from these studies. First, the number of respondents, in each of the four studies, mean scores and standard deviations for the nine problems areas were tabulated. Second, the nine problem areas were rank ordered based on the mean scores. Frequencies, means and percentages were used to compare and contrast the findings

RESULTS AND CONCLUSIONS

The study examined the relative importance of nine extension problem areas in a variety of settings. Additionally, the responses of agricultural personnel of different ranks/position were cross-checked. Eight of the nine problem areas--organization, mobility, equipment, extension training, & technology--were considered in all the four studies reviewed for this paper. While one of the problem areas--coordination--was considered in all but the Swanson and Sigman 1984 study. Figure 1 presents a summary of the findings from the four studies (Sigman and Swanson, 1984; Radhakrishna and Bowen, 1990; Radhakrishna and Veerabhadraiah, 1991; and Ukaga and Radhakrishna, 1992). Examination of findings from the four studies reveal that constraints to the effectiveness of extension varied across geographic locations and by type of respondents.

Location. Lack of teaching aids was found to be a greater problem in Africa than in Asia; and mobility appeared to be more of a problem in Asia than in Africa. Similarly, insufficient extension training was reported to be more of a problem in Asia than in Africa. Conversely, lack of essential teaching and communication equipment appears to be a general problem regardless of the setting or country examined. Technical training and linkage were the least of all problems regardless of setting/region examined in these studies.

Level of respondents: Extension officers at the grass-roots level tended to perceive lack of appropriate technology, and lack of necessary equipment as problems more than those at the national and international levels. But organization was perceived to be more of a problem at international and national levels than at the grass-roots level. Technical training and linkage were the least of all problems regardless of level of respondents examined in these studies. The differences in perceptions of problems when examined by level of respondents (local vs national or regional) raises an important factor for developing a unified approach by personnel at all levels in developing an delivering effective extension programs. Covey (1989) indicates that bringing about personal and organizational change requires empathic communication among persons at all levels of an organization leading to an organizational synergy which serves as a basis for personal renewal and commitment. Woodcock and Francis (1979) indicate when people at different levels of an agency have differing perceptions of issues and problems the consequences may be low motivation, low creativity, poor teamwork, fragmented programs, and personal and agency stagnation. In essence a lack of congruence regarding the major issues and problems of extension personnel at the local level by personnel at various levels of the extension system may create "blockages" which inhibit the effectiveness of the extension system. Unfortunately in

	STUDIES			
Variables	Sigman and Swanson (1984)*	Radhakrishna and Bowen (1990)	Radhakrishna and Veerabhadraiah (1992)	Ukaga and Radhakrishna (1992)
Background Information				
Region/Continent	World	India/Asia	Karnataka/India	Imo State/Nigeria
Subjects	Extension Directors	Extension Directors	Agricultural Officers	Extension Officers
Level	International	National	Local (District)	Local (Village)
Measurement	Mail Survey	Mail Survey	Mail Survey	Mail Survey
Ranking of Problem Areas				
1	Organization	Mobility	Equipment Equipment	
2	Mobility	Equipment	Mobility	Teachinng Aids
3	Equipment	Organization	Extension Training	Coordination
4	Extension Training	Coordination	Technology	Mobility
5	Teaching Aids	Extension Training	Coordination	Technology
6	Technical Training	Technical Training	Organization	Organization
7	Technology	Technology	Technical Training	Extension Training
8	Linkage	Linkage	Linkage	Technical Training
9	NA	Teaching Aids	Teaching Aids	Linkage

* Coordination as a problem was not measured in this study.

Figure 1. Summary of Findings from Four Studies which examined extension problems in Africa and Asia

Africa and Asia the authors, as documented in previous research and our personal experiences, found that there exists a lack of understanding by national-level personnel regarding the specific issues and problems local extension personnel encounter. Such local problems as lack of appropriate technology, equipment, transport, and poor timing of inputs arriving for farmers are real and directly influence the effectiveness of the extension organization. Until national-level personnel recognize and deal with such problems, the moral of local extension personnel and their ability to educate local clients will be inhibited.

EDUCATIONAL IMPORTANCE

Findings from the review of these studies and the experiences of the authors suggest that extension educators should examine various studies from different countries to better understand extension problems around the world. However, the authors caution that studies completed in different countries/settings should not be used as a substitute for studying and understanding a target population. While findings from one setting may apply to some extent in another setting, it is pertinent to note that given populations may be similar on certain variables (e.g., linkage in this study and vary on others).

Second, findings from the review suggest that extension officers in the field had consistent perceptions regarding extension problems regardless of their locations and timing of study. The same was true of extension directors as well. However, extension directors and field officers differed on certain problem areas. (organization, technology and equipment). Two reasons could possibly explain the variance in perceptions between extension workers in the field and the directors who are less conversant with the field. Field based extension workers may know more about problems associated with day-to-day field work because they are directly involved in such matters than their directors. Conversely, extension directors who are higher-up in the organizational hierarchy may be more familiar with administrative/organizational issues. Thus, perceptions may vary among groups of people and the findings of a researcher may depend on who/what was investigated. This calls for a holistic approach to research and program development. It is also critical that the "right" group or situation is examined so that results are appropriate for the target population. This way, one can insure that the "real" problems as well as their solutions are identified by the appropriate groups. Extension needs to have the best possible understanding of clientele's situations and needs in order to provide necessary and useful services.

Third, development agents, especially expatriates, should go beyond the obvious (as they examine results from studies such as those cited) and try to find out the reasons behind research findings. For instance, a further inquiry into the variance between Indian extension agents and Nigerian agents on the mobility issue reveals that the large number of extension workers coupled with high cost of oil makes mobility in India as a major problem. On the other hand, Nigeria has fewer numbers of extension workers and is a major producer of petroleum. It is therefore not surprising that the Nigerian extension officers ranked mobility problem lower than their Indian counterparts.

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Relationship Between Supervisory Techniques of Extension Supervisors and Organizational Outcomes in Uganda

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Introduction

The Uganda, East African populace is mainly agricultural, characterized by small holder mixed farming. The agricultural sector employs about 80 percent of the population, accounting for about 60 percent of the Gross Domestic Product and for 90 percent of its export earnings. Therefore, agriculture is the lifeblood of the Nation, hence the efficiency and effectiveness of the agricultural practices are of paramount importance to the survival of the Nation.

Improved quality of extension supervision is one target for bringing about improvement in agricultural production, and subsequently, in the national economy. Supervision is vital to the success and impact of extension. A properly managed and supervised organization creates progress--it transforms its inputs into the satisfaction of human needs (Buford and Bedeian, 1988). A number of sources have observed that Uganda's agricultural extension service agents are unmotivated, demoralized, and are consequently not performing to the expectations of the organization (World Bank, 1987; Hedges et al., 1988; & Africa Research Bulletin, 1988). Indeed, Uganda's agricultural extension services are not effective enough (Uganda Ministry of Agriculture, 1989; & Hedges et al., 1988). Bucanayandi (1990) and USAID (1987) identified supervision as one of the weaknesses in Uganda's extension system. The combination of these factors, coupled with lack of promotions, unreliable transportation, non-payment of allowances and the like, have greatly depressed performances.

Purpose

The purpose of this study was to examine the supervision practiced by Ugandan extension supervisors based upon their perceptions and the extension agents' (their supervisees) perceptions. The relationship between demographic variables and the extension agents' perception of supervisory styles of the supervisors was also explored. The specific objectives of the study were to:

1. Describe the personal characteristics of the extension supervisors, deputy supervisors, and extension agents in the Uganda Extension Service.
2. Determine the supervisory style (i.e., transformation, transactional, non-leadership) of the extension supervisors in Uganda.
3. Compare the perceptions of the agricultural extension field supervisors with those of their supervisees (extension agents) regarding leadership for effective job motivation and performance.
4. Identify specific supervisory factors which affect the performance of the extension supervisors.

5. Determine what organizational outcomes (i.e., satisfaction with the leader, individual and group effectiveness, extra effort by followers) arise from the leadership style employed by the extension supervisors.
6. Determine if there were variations among the extension supervisors as far as their ratings by the extension agents was concerned.
7. Determine the relationships between the extension agents' ratings of their supervisors and some of their personal characteristics.

Methodology

A descriptive survey research design was used to gather data concerning the leadership and supervisory techniques of the extension supervisors and extension agents in Eastern Uganda, East Africa. The population for the study were the extension agents and field supervisors and their deputies in the districts of Tororo, Mbale, Kapchorwa, Kumi, Soroti, Iganga, Jinja, and Kamuli in Eastern Uganda.

Population and Instrumentation.

A census of extension supervisors and extension agents was taken from these districts. Frame error was controlled by obtaining a complete up-to-date list of all supervisors and extension agents in the eight districts. The instrument used to measure the leadership behaviors and effectiveness was the Multifactor Leadership Questionnaire (MLQ), developed by Bass and Avolio (1990) and published by the Consulting Psychologists Press, Palo Alto, California. A panel of experts and a field test were used to ensure the MLQ was content and face valid. There were two versions of the questionnaire: the self-rating form, in which the supervisor rated himself or herself as a supervisor, and the rater form, in which a supervisee rated the supervisor.

Data Collection and Analysis

The data were collected from October through December 1992 by personal administration of the questionnaire by the researcher. The questionnaire was administered (hand delivered) on appointed days to the extension supervisors and extension agents in the selected districts by the research. Questionnaires were completed during the meeting. Due to a high absentee rate of extension agents, the researcher returned to each of the eight district offices numerous times to administer the questionnaire. All extension supervisors (8) and deputy extension supervisors (8) completed the questionnaire and 164 of the 220 extension agents completed the questionnaire. The analysis of data included descriptive statistical methods and measures of central tendencies and dispersion to summarize and organize the data. Measures of association were used to determine the linear relationship between the supervisory style and supervisors effectiveness and organizational outcomes. Analysis of variance, and t-tests were used to test for differences existing between supervisory style and effectiveness among the respondents by age, academic qualification, numbers of inservice courses, and length of service in the Uganda Extension Service.

Results and Conclusions

Findings

The respondent characteristics studied were gender, age, education, number of years in the service, number of courses taken in leadership, number of offices held since joining the ministry, years in the position of supervisor, and the number of meetings convened by the leader in the last year. Of the 164 extension agents responding, 87.8 percent were male. The gender of the supervisors was balanced, 50 percent male and 50 percent female; however, 87.5 percent of the deputy supervisors were male and only 12.5 percent were female. The mean age was 39.9 years for the supervisors, 36.1 years for the deputy supervisors, and 39.9 years for the extension agents.

Twenty-five percent of the supervisors had masters degrees and 75 percent held bachelors degrees. Of the extension agents, 3.1 percent held masters degrees, while 12.8 percent held bachelors degrees, and the majority (84.1%) had a general agriculture diploma. Of the deputy supervisors, 37.5 percent held a bachelors degree and an equal number had a diploma in general agriculture. The majority (87.5%) of extension agents had, as their major area of study, agricultural sciences while 12.5 percent held their highest qualification in other fields, including economics. All of the supervisors and deputy supervisors had agriculture as their primary education background.

The average number of years that the extension agents were employed in agricultural extension was 16.8 years, and 50 percent of the supervisors had worked in the Ministry for 11-15 years, but for an average of only three years as supervisors. About two-thirds of the deputy supervisors had one to three years of experience in their current positions. Over one-third of the supervisors had not attended a workshop in leadership during the last two years and 50 percent of the supervisors had not convened a staff meeting in the last year.

Leadership Styles of the Extension Supervisors. The leadership styles of the supervisors were divided into three categories with seven leadership factors imbedded within the categories: transformational leadership (idealized influence, inspirational, intellectual stimulation, and individual consideration); transactional leadership (contingent reward and management-by-exception); and non-leadership (laissez-faire). See Table 1.

A wide discrepancy occurred between the supervisors' and deputy supervisors' self-ratings and the subordinates' (extension agents) ratings of their leadership. The leaders tended to inflate their scores above those generated by subordinates, thereby giving the impression that they were more effective than they actually were.

Leaders perceived their dominant style to be inspirational (mean = 3.2); while subordinates perceived that the supervisors used charismatic and individual consideration relatively more (mean = 2.4). Leaders saw themselves as using charismatic, intellectual stimulation, and individual consideration as their second most used style. Extension agents saw them as being charismatic, and individually considerate as their second most predominant type of leadership. The least used styles were contingent reward, management-by-exception, and laissez-faire.

Comparison of the Supervisors' and Extension Agents' Perception of the Way Supervisors Lead. A t-test was used to determine if there were significant differences between the mean self perceptions of the supervisors and deputy supervisors leadership style and the mean ratings of extension agents. Significant differences were found between the perceptions of the leaders and those of their subordinates (extension agents) on all but one leadership style. The extension agents rated their supervisors significantly lower in leadership styles than did the supervisors and deputy supervisors themselves.

Table 1

The Supervisors' Mean Self–Ratings and the Extension Agents' Mean Ratings (Organizational Norms) of the Supervisors on Leadership Styles

	Respon-dent	Score	Mean S-R	Percentage of Responses 0	1	2	3	4	NR
Transformational Leadership									
Idealized Influence	S	2.9		0	0	12.5	87.5	0	0
	R	2.4	0.5	3	14	33	43	7	0
Inspirational	S	3.2		0	0	12	63	25	0
	R	2.3	0.9	1	15	44	35	5	0
Intellectual Stimulation	S	2.9		0	13	13	62	12	0
	R	2.3	0.6	1	15	41	36	6	1
Individual Consideration	S	3.2		0	0	25	25	50	0
	R	2.5	0.7	2	13	30	44	10	1
Transactional Leadership									
Contingent Reward	S	2.6		0	0	37	63	0	0
	R	2.2	0.4	3	21	39	34	1	2
Management-by-Exception	S	2.2		0	25	25	50	0	0
	R	2.1	0.1	0	15	61	22	1	1
Nonleadership									
Laissez-Faire	S	0.4		0	62.5	37.5	0	0	0
	R	1.2	-0.8	21	47	26	4	0	2

Key: S = All self-ratings by the population of district supervisors (n = 8)
R = All extension agents' ratings of the supervisors (n = 164)

0 = Not at all
1 = Once in a while
2 = Sometimes
3 = Fairly often
4 = Frequently, if not always
NR = Non-response

No significant differences were found between the supervisors and deputy supervisors on any leadership style. This indicates that both categories of leaders appear to be distanced from their subordinates and to view their leadership style as more effective than the extension agents saw them.

Identification of Specific Leadership Factors Inhibiting the Supervisors' Performance. The average factor score ratings for the total sample generated by the raters on all three leadership styles (transformational, transactional, and non-leadership) ranged between 2.3 and 2.4 (0=Not at all; 1=Once in awhile; 2=Sometimes; 3=Fairly often; and 4=Frequently, if not always). The leaders displayed transformational leadership behaviors, though on the lower side.

This group of leaders would be described as only slightly inspiring, intellectually stimulating, individually considerate, or charismatic. The overall group is skewed towards the lower part of the scale range on almost all transformational as well as transactional leadership items.

It would appear that they may not be able to articulate in simple ways, shared goals and mutual understanding of what is right and important. They ought to learn how to provide vision of what is possible and how to attain it. They may not be able to promote positive expectations about what needs to be done. The ability to set high standards, spurring the subordinates through stimulating talks is of paramount importance to these leaders.

As a group, they tend towards corrective action rather than constructive exchanges. Although there are discrepancies between self ratings and rating by supervisees, the leaders themselves do not evaluate their own performance very high either, indicative of lack of confidence, an unhealthy situation for those in leadership positions. The discrepancies in the charismatic, inspirational, intellectual stimulation, and individual consideration factors should all be attended to in the first stage of development among the leaders.

Organizational (Performance) Outcomes Resulting from the Different Leadership Styles. The general pattern of ratings produced by supervisees (extension agents) depicts a sample of leaders who are not very effective across the respective outcome (performance) factors. Scores produced by subordinates ranged from 2.8 to 2.1, with the greatest majority being at or below 2.2 which is on the low side. See Table 2.

Shifting all ratings to above 3.0 would be the reasonable target goal for the leaders to be considered very effective. The tendency for the leaders to see themselves as far more effective than do their subordinates (as evidenced by their ratings) is quite disturbing. The large discrepancy of scores in all six factors should be cause for concern. Discrepancies regarding "amount of extra effort," "satisfaction," and possibly "relations to higher-ups" and "job effectiveness" should be attended to in a feedback session to help determine how to bring those scores in line. The overall satisfaction rating for this group of leaders (mean = 2.8) demonstrates that subordinates's general feelings about their leaders were not all positive and therefore needs substantial improvement.

Differences Among the District Extension Supervisors. ANOVA was used to determine if there were differences among the extension supervisors as rated by the extension agents. Significant differences were found in the subordinates ratings of the supervisors on all leadership factors, except the management-by-exception.

The leaders who turned out to be consistently the most charismatic, inspiring and intellectually stimulating, in relative terms, were female. Age did not seem to be related to the MLQ scores. The leaders with higher educational qualifications (masters) seemed to score higher on the transformational leadership scores.

Relationship Between Extension Agents' Perception and Their Demographic Characteristics. The females tended to exert more effort and were more satisfied with their leaders; except they perceived that they were rather poorer in their relationships with higher authorities than their male counterparts thought. The relationships between age and perception were positive, but negligible for relations to higher-ups, unit effectiveness, and job effectiveness, but negative and negligible for the amount of extra effort. The relationship between marital status and extension agents' perception of outcome factors was generally positive and ranged from negligible to low. The relationship between duration of service and extension agents'

Table 2

The Supervisors' Mean Self–Ratings and the Extension Agents' Mean Ratings (Organizational Norms) of the Supervisors on Organizational Outcome Factors

	Respondent	Mean Score	Percentage of Responses S-R	0	1	2	3	4	NR
Outcomes for the Organization									
Amount of Extra Effort[a]	S	3.1		0	0	25	50	25	0
	R	2.2	0.9	5	19	37	32	5	2
Relations to Higher-ups[b]	S	2.8		0	0	63	37	0	0
	R	2.4	0.4	1	14	37	34	11	3
Unit Effectiveness[b]	S	2.4		0	0	63	37	0	0
	R	2.1	0.3	3	13	53	23	4	4
Job Effectiveness[b]	S	2.6		0	0	50	37	13	0
	R	2.2	0.4	4	18	36	30	7	5
Satisfaction with the Leader[c]	S	3.3		0	0	12	50	38	0
	R	2.8	0.5	5	13	14	48	18	2

Key: S = All self-ratings by the population of district supervisors (n = 8)
R = All extension agents' ratings of the supervisors (n = 164)

Amount of Extra Effort[a]	Relations to Higher-ups and Effectiveness[b]	Satisfaction[c]
0 = Not at all	0 = Not effective	0 = Very dissatisfied
1 = Once in a while	1 = Only slightly effective	1 = Somewhat dissatisfied
2 = Sometimes	2 = Effective	2 = Neither satisfied nor dissatisfied
3 = Fairly often	3 = Very effective	3 = Fairly satisfied
4 = Frequently, if not always	4 = Extremely effective	4 = Very satisfied

perception of outcome factors ranged from negligible to low. The longer extension agents had served, the less extra effort they exerted and the less satisfied they tended to be with their leaders.

A significant relationship was found between number of courses attended and the extension agents' perception. The more courses the extension agent had attended, the more critical they seem to be of their supervisors' capability in organizational effectiveness. The strength of the relationship between extension agents' perception of outcome factors and their frequency of meetings with their supervisors were all positive and moderate. The more meetings, the closer the perceptions of the extension agents are to those of their supervisors.

The more the extension agents had served under a given supervisor, the lower they appeared to have rated him or her on outcome factors; also, the less satisfied they were with the leaders; and the less extra effort they tended to exert.

Conclusions

The review of literature and the findings of this study support the following conclusions:

1. A large discrepancy existed between how the supervisors believe they lead and how they are perceived by their subordinates to be leading. The extension agents' perception of their supervisors' was that their use of transformational leadership was rudimentary. Supervisors were using transformational leadership to a very limited extent (the subscale mean range was 2.3 – 2.5) as opposed to the recommended minimum of 2.8 – 3.0 (Bass and Avolio, 1990). Supervisors used management–by–exception and laissez–faire to a greater extent (mean score = 1.2) than they thought.
2. Female supervisors excelled in the practice of transformational leadership. Male supervisors were more transactional.
3. The educational qualification affected the choice of leadership style. Supervisors who held higher educational qualifications tended to use more inspirational, charismatic, intellectually stimulating and individually considerate styles than those who tended to use transactional methods.
4. Supervisors who held their positions for a long period of time tended to generate less extra effort and satisfaction from their subordinates. Leaders who held meetings and attended inservice courses regularly generated significantly more extra effort and satisfaction from their subordinates.
5. The married extension agents tended to exert less extra effort but tended to be more satisfied with their supervisors. They rated their supervisors higher on relations to higher–ups, unit and job effectiveness.
6. The older extension agents tended to exert less extra effort and were less satisfied with their supervisors and rated them low on organizational effectiveness.
7. Laissez–faire leaders generated less outcomes for the organization and also less satisfaction from subordinates. The correlation between leadership styles and performance (organizational outcomes) indicated that the charismatic, intellectually stimulating, and inspiring leadership style gave rise to superior outcomes for the organization.

Educational Importance

Recommendations for both the supervisors and administrators in the Uganda Agricultural Extension Service.

1. MLQ scores should be used to identify candidates for selection to training programs, promotions and transfers to leadership positions. These could be used for identifying individuals for individual as well as group development. Immediate remedial training programs should be mounted by the administrators and trainers in the ministry of agriculture with follow–up studies, to determine if the leadership scenario is improving or not.

2. The extension administrators and trainers should include sessions on leadership techniques and skills into their routine in–service programs with specific attention directed to the transformational leadership approach.
3. District extension supervisors should critically carry out self–examination and possibly adjust their role behavior so as to meet the needs and obligations of their jobs and subordinates.
4. All new extension supervisors and deputy supervisors should be exposed to an orientation session, included among which should be the subject of leadership skills.
5. Leadership and management should be included as a major component of any university level program on extension/adult education.
6. An in–house annual appraisal of district supervisors to determine their compliance with minimum standards of performance and general worthiness should be carried out by their subordinates so as to generate feedback needed for improvements and general administrative decisions at the higher level.
7. A systematic human resource/manpower development program be mounted to upgrade the educational qualifications, preferably to a Msc. degree level, of district supervisors.
8. More females should be appointed into leadership position.
9. Supervisors should be encouraged by the administration to hold frequent meetings, e.g., monthly, with subordinates, to enhance interaction and participative management.

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FACTORS RELATED TO THE MOTIVATION OF EXTENSION AGENTS IN KENYA'S RIFT VALLEY PROVINCE*

Introduction

Employees work harder and perform better if motivated and satisfied with their jobs (Beder, 1990: Watanabe, 1991). Motivation- -the psychological process that gives purpose, direction, and intensity to behavior- -is the most important determinant of effective job performance and is mainly responsible for differential work output (Kreitner, 1989; Lawler III, 1973). Staff motivation changes as time and conditions change, depends on incentives that the staff value and believe to be attainable with increased individual performance, and is high when staff frustration is minimal (Beder, 1990; Cohen, 1990; Watanabe, 1991).

Maslow (1943) indicated that people are motivated by their needs for survival, safety, love, self-esteem and self-actualization, while Herzberg (1972) stressed the need for a favorable work environment saying that enriched jobs rather than pay, supervision, and other environmental factors were the key to motivation and job satisfaction. Herzberg believed that challenging, enriched jobs motivate employees more than dull, routine jobs. He advised managers to redesign jobs to provide opportunities for individual achievement, recognition, responsibility, advancement and personal growth. For professional employees, job characteristics such as autonomy, task identity, and perceived task significance have an important motivational value (Buford & Bedeian, 1988; Kreitner, 1989; Perry & Wise, 1990). For example, highly educated and more experienced workers are more likely to choose the public sector, offsetting lower wages with rewards arising from the characteristics of their jobs (Perry & Wise, 1990).

If employees believe their actions would lead to valuable, attainable rewards, they will work harder (Vroom, 1964). Therefore, managers should identify, support and reinforce individual perception by linking appraisal to professional and personal development, and because treating employees inequitably lowers their motivation and performance (Adams & Rosenbaum, 1962), they should make inputs required for outcomes as explicit as possible. Because behaviors resulting in desirable consequences are likely to recur while those that result in undesirable consequences are less likely to recur (Skinner, 1969), managers should state which behaviors will be rewarded and which ones will not, and should tie rewards to individual performance.

It is harder for Extension to serve its clients well without adequate staff incentives (Moris, 1987). For Africa's agents, and Kenya's in particular, these incentives include housing, transportation, pay, health insurance, subsistence allowances while on official duty, and working under well trained Extension supervisors with personnel management skills needed to motivate their staff. The importance of these incentives has also been identified by the researchers who are familiar with Kenya's Extension Service. One of the researchers had over ten years of work experience at different levels of responsibilities within Kenya's Extension Service.

Because employees work harder and perform better if motivated and satisfied with their jobs, Extension managers should know what motivates their staff to prevent motivational problems and employees' frustration (Grossnickle & Thiel, 1988; Beder, 1990; Watanabe, 1991). Current information regarding the job satisfaction and motivation of Extension agents in Kenya's Rift Valley Province was not available. Hence the need for the study. This study was important because reliable information is essential for good decision making and accountability (Altschuld & Thomas, 1991); and it was in Kenya's public interest to promote agricultural production through Extension (Kenya Government, 1986 & 1990). Agents' needs should be identified regularly in order to provide meaningful, motivational, staff incentive (Kreitner, 1989). Furthermore, as times and conditions change, past motivational strategies become ineffective (Buford & Bedeian, 1988).

Purpose

The researchers aimed at identifying job satisfaction factors related to motivation. Specifically, they sought to: (1) identify the agents' personal characteristics; (2) identify underlying factors of job satisfaction and their relative importance; (3) determine the agents' motivational level; and (4) examine relationships between the personal characteristics, job satisfaction, and job motivation. The study was limited to factors identified by the researchers from the literature and personal experiences with Kenya's Extension Service. Generalizations were confined to Rift Valley Extension agents who participated in the study. The researchers assumed positive motivation to be the reason agents desire to excel in their work performance and that the agents understood the questions and responded frankly, realized how important their contributions were in helping Extension managers develop effective staff motivational programs, and were willing to share freely their views and personal feelings.

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Methodology

A one-shot case study design (Campbell & Stanley, 1963) was chosen in this descriptive, correlational research to collect data using a group administered, closed-ended questionnaire with 105 job satisfaction, 10 motivational, and 10 personal characteristics items. Each item in section one and two had a five point Likert-type scale (Mueller, 1986) as follows: 1=Strongly Disagree, 2=Disagree, 3=Uncertain, 4=Agree, and 5=Strongly Agree. Job satisfaction factors and agents' personal characteristics formed independent and extraneous variables respectively. Motivation was the dependent variable. Eleven professionals, two of who had worked for many years with Kenya's Extension Service, found the questionnaire to be content valid. The questionnaire had an eleventh-grade reading level and a reliability of .79 for the job satisfaction and .81 for the job motivation items respectively. Since a commonly used threshold for acceptable reliability is .70 (Hair et al., 1992), the questionnaire was considered reliable. In each district, the agents were also asked as a group, five open-ended questions as follows: (1) Were the questions clear? (2) Was the English understandable? (3) Did the questions cover things that interest Extension staff? (4) Are there things that ought to have been covered that were omitted? (5) Would you say that Extension staff are highly motivated, motivated or not motivated? Of the 2,087 agents who formed the frame, and accessible population, a random sample of 325 agents, stratified by rank (i.e., Agricultural Assistants, Assistant Agricultural Officers and Agricultural Officers) and gender, completed the questionnaire; about 85% of them as scheduled. A follow-up of the remaining 15% raised the response rate to 100%. Data were collected in winter 1993 and analyzed using the SPSS statistical package with alpha set at .05 level. Exploratory factor analysis was used to identify job satisfaction factors related to motivation.

Results and Conclusions

Objective one sought to identify the agents' personal characteristics: gender, age, marital status, formal education and years of service. On the average, the agents were 34.6 years of age, had worked for 9.6 years, 85% were married while 14.5% had never been married, .05 were either divorced or widowed, 77% were male, 50.3% were 31-35 years, 86.5% had worked from 1 to 15 years, 41% had not been promoted, and 50.9% had been promoted once, 6.5% twice, 1.0% three times and 0.3% four times. Their age ranged from 24 to 55 years, their total years in service from 1 to 33, and their qualifications from a post-secondary agricultural certificate to a master's degree. Agricultural Assistants had the longest number of years of service (10.5) followed by Assistant Agricultural Officers (8.5) and Agricultural Officers (5.2). All Agricultural Officers had 10 years or less of service. Agricultural Assistants had worked longest in their current positions (5.5 years) while the agents in the other two ranks had served for 3.9 years in their current positions.

Objective two sought to identify job satisfaction factors and their relative importance. Factor analysis was used to determine the underlying dimensions of job satisfaction, (see Table 1) as recommended by Ford et al. (1986), Norusis (1990), and Hair et al. (1992). A maximum likelihood factor analysis was conducted with the assumption that the variance of each measured variable could be decomposed into common and unique portions. This approach was appropriate because the measured variances were assumed to be a linear function of the measured variables (Ford et al., 1986). The maximum likelihood factor analysis method was also deemed appropriate because the analysis was done using a sample rather than a population (Norusis, 1990). Hair et al. (1992) indicated that factor analysis needed at least a sample of 50 but preferably 100 observations. They recommended 4 or 5 observations per variable but pointed out that researchers are often forced to factor-analyze a set of variables when only a 2:1 ratio of observations to variables is available. This exploratory study used approximately three subjects per item. The number of factors to extract before the unique variance begins to dominate common variance was based on a combination of the Latent Root Criterion (eigen value >1) and the Scree Test Criterion (Hair et al., 1992). This procedure indicated that eight out of twenty one initial factors identified by the researchers from the literature and from personal experience were significantly related to the agents' job satisfaction and explained 24% of the variance. Since the factors were not assumed to be orthogonal with one another, the Oblimin rotation with maximum likelihood was used for extraction and to arrive at the factor matrix loadings. Table 1 indicates the items with their factor loadings. Ford et al. (1986) indicated that only variables with loadings greater than .40 should be considered in defining a factor. In this study, only variables with factor loadings of .40 or higher were reported (see Table 1). Factor names and the percent of variance each factor explained were as follows: evaluation (7.4%), dependable supervisors (5.3%), work incentives (2.8%), pay (2.2%), praise and work location (1.8%), housing and transportation (1.6%), job security (1.5%) and administration and supervision (1.3%). The factors were named by a panel of nine experts. Table 2 presents the interfactor correlations for the obliquely rotated factors. The data support the assumption that the researchers made earlier in the paper that the factors were not orthogonal.

Table 1

Rotated Factor Matrix Loadings Order of 35 Job Satisfaction Items on Oblique Factors and the Means and Standard Deviations for the Items (n=325)

Item	Abbreviated Variable Label[a]	Factor Loading	Mean	SD
	Factor 1=Evaluation			
60	Being recognized for good work increases my motivation	.50	4.18	.82
87	Evaluation of my work motivates me to work harder	.50	4.14	.77
33	Feedback from my supervisor increases my motivation	.49	4.21	.78
45	Positive recognition makes me proud to be an agent	.47	4.42	.82
92	I enjoy meeting my supervisor to discuss my work.	.46	3.74	1.05
61	Effective supervisors praise agents for good performance	.41	3.52	1.14
20	My supervisor's feedback gives me confidence in my job	.41	4.35	.77
116	Praise for good performance increases my desire to excel	.41	4.09	.89
	Factor 2=Dependable Supervisors			
43	My supervisor tends to concentrate more on my mistakes	.64	3.20	1.30
28	I get more negative input than help from my supervisor	.64	3.63	1.31
15	I frequently receive positive recognition for good work	.50	2.87	1.32
30	In Extension most hardworking agents go unrewarded	.49	1.81	1.14
57	I am satisfied with most of the current Extension policies	.49	2.56	1.14
97	My supervisor makes my work more pleasant	.44	3.33	1.10
16	I have a chance to do things for which I am most qualified	.42	3.28	1.39
	Factor 3=Work Incentives			
88	I work hard mainly to avoid being disciplined	-.46	2.10	1.02
37	Evaluating me on work objectives would lower my motivation	.44	3.83	1.01
	Factor 4=Pay			
24	I am more motivated by pay than by the work I do	-.57	3.92	1.17
84	Higher pay is more important to me than job security	-.54	3.94	.96
58	In extension, pay is the most important thing to me	.45	2.15	1.02
	Factor 5=Praise & Work Location			
46	Praise has little influence on my work performance	.50	3.72	1.10
36	I deserve little positive recognition for doing my job well	.47	4.06	1.16
32	I prefer working far away from my home area	.47	3.79	1.20
59	I should be praised less frequently for doing my job well	.44	3.39	1.11
52	Being praised makes me feel flattered	.44	3.69	1.00
	Factor 6=Housing & Transportation			
80	Good housing increases my motivation to work	.76	4.11	.85
82	Housing has little influence on my job satisfaction	.68	3.96	.93
51	Good housing contributes to favorable work environment	.60	4.42	.74
6	Good housing contributes to my job satisfaction	.60	4.26	.94
76	Inadequate transport reduces my job effectiveness	.45	4.15	1.05
99	Adequate transport gives me job satisfaction	.42	4.38	.79
	Factor 7=Job Security			
22	I prefer a secure job that pays less than insecure one that pays more	-.55	3.62	1.39
26	Feeling secure on the job motivates me to work harder.	-.41	4.38	.82
	Factor 8=Administration & Supervision			
100	Extension administration has little influence on my work performance	.47	3.83	1.00
96	Supervision from my boss has little effect on how I work	.41	3.55	1.08

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[a] Negative items 24, , 28, 30, 32, 36, 37, 43, 46, 52, 59, 82, 84, 96, & 100 were recoded (1 represented the lowest and 5 the highest level of job satisfaction). The items were rated on a scale of 1 to 5 where 1=Strongly Disagree, 2=Disagree, 3=Undecided, 4=Agree, 5=Strongly Agree.

Table 2

Interfactor Correlations for the Oblique Rotated Factors Underlying Job Satisfaction of the Extension Agents in Kenya's Rift Valley Province (n=325)

Factors	1	2	3	4	5	6	7	8
Evaluation	1.00							
Dependable Supervisors	.13	1.00						
Work Incentives	.10	.12	1.00					
Pay	-.01	-.18	-.23	1.00				
Praise & Work Location	.08	-.08	.08	.03	1.00			
Housing & Transportation	.29	-.07	.09	.06	.16	1.00		
Job Security	-.19	-.03	-.02	-.02	-.04	-.16	1.00	
Administration & Supervision	.05	-.02	.09	.07	.08	-.20	-.004	1.00

Objective three sought to determine the agents' motivational level. The overall agents' mean motivational-level (see Table 3 for mean and standard deviation of each variable) score was 3.66 on a scale of 1 to 5 (1=lowest & 5=highest). Within the agents' ranks, the motivational level was 3.80 for Agricultural Assistants, 3.43 for Assistant Agricultural Officers, and 3.40 for Agricultural Officers. Since an analysis of variance indicated that the differences in the motivational level of these three groups were statistically significant, the Tukey's HSD post hoc test was applied to determine which groups were different. The results indicated that Agricultural Assistants were significantly different in their motivational level from Assistant Agricultural Officers and Agricultural Officers but Assistant Agricultural Officers were not significantly different from Agricultural Officers. An F test revealed that the motivational level of males (3.66) was not significantly different from that of females (3.67).

In group interviews, the agents in 11 districts said they were not motivated while in one district they said they were motivated. In the district in which the agents described themselves as motivated, their District Agricultural Officer had received superior ratings, praise and admiration as a staff motivator from supervisors and had won the agents trust. This finding further confirmed that having dependable supervisors (i.e. persons worthy of being trusted to provide motivational and work related support) was the most important factor related to staff motivation.

Table 3

Agents' Job Motivation Variables and Mean Motivational Level (n=325)

Item	Variable Label[a]	Mean	SD
9	I often think of leaving the Extension service	3.76	1.27
38	Working as an Extension agent is in itself rewarding	3.79	1.07
42	I am highly motivated as an agent	3.27	1.38
64	I love my job	4.33	.74
102	My job is frustrating	3.91	1.14
105	I wish I had chosen a different career	4.04	1.03
109	The hours I spend on the job are the ones I enjoy most	3.67	1.03
113	If I were to choose a career once more, I would choose to be an extension agent	3.80	1.08
114	While on vacation, I often wish I were back to work	2.90	1.16
115	In the Extension Service, I have many opportunities for personal growth	3.15	.27

Note: [a] Negative items 9, 102, and 105, were recoded before calculating the variable means and standard deviations (1 represented the lowest and 5 the highest level of motivation).

Mean = 3.66
SD = .72
Min = 1.4
Max = 5.0

The agents interviewed believed their promotions were more related to years of service than to individual performance. They also indicated that in recruiting staff for training, merit was being overlooked or not seriously considered. Although factors such as one's past academic record, work performance, years since graduation, and home district were used in selecting an agent for further training, in the agents' view, merit ought to be the most important criterion for selection. Allowances and health insurance were also important for the agents' motivation. Per diem in Kenya for officers on duty is based on rank. Hence, it was difficult for low-ranking and high-ranking agents to stay in the same hotels due to reimbursement problems. Low-ranking agents felt that all technical staff, irrespective of rank, should receive equal per diem for travel and hotel accommodation. However, most high-ranking agents felt that per diem based on rank help attract low-ranking agents to move up through the ranks.

Objective four sought to examine the relationships between independent variables and the dependent variable. A very strong association existed between the agents' age and total years in service (r=.90), and between the agents' rank and formal education (r=.95). The presence of highly correlated independent variables, indicated that one variable can be explained or predicted by the other. This multicollinearity limits the size of R^2 or incorrectly estimates the regression coefficients (Hair et al. 1992). To control the effects of multicollinearity, the variable less strongly correlated with motivation in each pair was dropped from further analysis. Thus age was dropped in favor of total years in service while formal education was dropped in favor of the agents' rank on the job.

Categorical variables: gender, marital status, rank and highest qualification were dummy coded and entered into the regression equation. When the stepwise procedure was used to regress motivation on personal characteristics, only agents' rank and years of service were statistically significant ($p < .05$). The procedure, repeated using the job satisfaction-factor scores plus agents' rank and years of service, indicated that only rank and five of the eight factors were statistically significant ($p < .05$).

To control the effects of extraneous variables (McCracken, 1991), the researcher entered the agents' rank on the job into a hierarchical regression equation first to determine the amount of unique variance it contributed. Rank accounted for about 7% of the variance in motivation. All the job satisfaction factors which were statistically significant in the stepwise regression equations were then entered in a hierarchical regression equation (see Table 4) in order of their importance. The final R^2 was .55 while adjusted R^2 was .54 indicating that the job satisfaction factors contributed an additional 48% of the variance in motivation after accounting for the variance contributed by the agents' rank. Final t test values indicated that rank was not statistically significant ($p < .05$). When motivation was regressed on the five job satisfaction factors in a stepwise regression equation omitting rank, an R^2 of .54 and an adjusted R^2 of .53 were obtained.

Table 4

Regression of Agents' Motivation on Agents' Rank and Selected Job Satisfaction Factor Scores - Hierarchical Entry (n=325)

Factors		R^2	R^2Ch	b	t	p
Rank:	Dummy3	.068	.068	.48	.38	.7025
	Dummy4	.068	.000	-1.34	-1.07	.2876
Dependable Supervisors		.352	.284	3.46	10.96	.0000
Pay		.449	.097	-2.55	-7.86	.0000
Job Security		.510	.061	-1.77	-5.20	.0000
Staff Evaluation		.539	.029	1.51	4.68	.0000
Administration & Supervision		.554	.015	-1.18	-3.19	.0016
Constant				36.67		

Note: Standard error = 4.87, Adjusted R^2 = .544, Model F = 52.96, $p<.0001$

The conclusions shown below are related to the objectives of the study and are generalizable to Extension agents in Kenya's Rift Valley Province. They are as follows:
1. The agents' personal characteristics were less important for their motivation than were the job satisfaction factors. 2. In decreasing order of their importance the eight factors found to be important for the agents' job satisfaction are evaluation, dependable supervisors, work incentives, pay, praise and work location, housing and transportation, job security, and administration and supervision. 3. Five of the eight factors were important in explaining the agents' motivation. In decreasing order of their importance, these factors were dependable supervisors, pay, job security, evaluation, and administration and supervision. 4. The agents' perception that merit was often ignored in selecting staff for further training caused them frustration and lowered their motivation. 5. On the basis of this study, the agents' motivational level was above the midpoint (2.50), on the positive side of the scale. 6. Over 50% of the variance in the agents' motivation can be explained by five job satisfaction factors. 7. Job satisfaction and motivation are related but different. This conclusion was based on the fact that eight factors were important in explaining the agents' job satisfaction but only five of these factors were important for their motivation. 8. The findings of this study may be useful to Extension managers whose agents have similar basic training and terms of service.

Educational Importance

To improve staff motivation, Extension managers should give more attention to the job satisfaction factors identified in this study and less attention to the agents' personal characteristics. For the agents studied, having dependable supervisors was the most important factor related to their motivation. Therefore, a very important step in improving staff motivation, and by implication (Davies et al., 1990; Kreitner, 1989; Lawler III, 1973; Grossnickle & Thiel, 1988; Perry & Wise, 1990), performance and productivity is to select individuals with desirable leadership qualities such as good interpersonal communication skills and train them as Extension supervisors. Agents' motivation may also be increased by tying pay to performance, providing job security, evaluating agents objectively and showing concern both for their productivity and welfare. Since the study has shown that motivation is positively related to job satisfaction, raising agents' motivation should help increase their job satisfaction.

The study emphasizes the importance of good relations with one's supervisor, administrative support, effective supervision, good pay and job security. In addition, the findings of the study support Vroom's (1964) recommendation that staff performance be assessed accurately; based on standards that employees perceive to be fair, achievable, and equal for all. The entire incentive system needs administrative backing and attention; and employees should be treated equally. Furthermore, as Skinner (1969) concluded, identical rewards for all employees are ineffective in motivating employees. Rewards must be based on individual performance.

In this study dependable supervisors are individuals with good interpersonal communication skills necessary for motivating staff. Supervision, as used in this study, is the process of giving the agents instruction, guidance and discipline which they require to fulfill their Extension duties and responsibilities. To succeed, this process requires mutual trust. An agent will consider a supervisor to be dependable on the basis of how the two individuals interact with each other. However, effective supervision depends on how the supervisor, the agent and the Extension organization interact with one another. Therefore, policy makers and people who provide Extension resources should do their work with the agents' welfare in mind.

To improve agents' motivation and job satisfaction, the researchers recommend that Extension managers in Rift Valley Province consider agents' concerns related to selecting staff for training, evaluating them for promotion and providing them with allowances and health insurance. Since Extension managers cannot be respected by their peers and subordinates unless they are qualified and competent, applicants for the positions of Extension supervisors should be evaluated thoroughly to ensure that they are suitable. Those selected should be trained regularly to give them personnel management skills necessary in motivating their staff. Extension managers should tie agents' pay to performance, provide agents with job security, evaluate them objectively and be supportive and sensitive to their welfare. The researchers also recommend that the study be replicated in other provinces to compare the results; that more studies be done in Rift Valley Province to identify factors that account for the unexplained variance in motivation and job satisfaction, and that studies be done to determine the impact of inservice training and payment of agents' allowances and benefits on agent's motivation. Finally, the researchers recommend that future studies include at least five items per factor under investigation to further refine and develop the data related to motivation and job satisfaction.

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DEVELOPMENT OF RURAL YOUTHS THROUGH FARMERS' TRAINING AND EDUCATION: A CASE STUDY OF THE NIGERIAN TOBACCO COMPANY PLC, YOUNG FARMERS' TRAINING PROGRAMME, KADUNA STATE, NIGERIA

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INTRODUCTION

The development of the Youths in Nigeria is largely a government affair. Although some private organisations have participated in youth development in Nigeria since the pre-independence era, the involvement of the private sector in meaningful youths development schemes is a recent phenomenon.

The concern about youths development borders on the belief that this segment of any society constitute a reservoir of abled labour force who can most easily become the leaders in employing and innovating modern techniques. The bans on the importation of a number of crops in Nigeria, under the Structural Adjustment Programme (SAP) and the subsequent encouragement for local production, forced many agro-industries to venture into more vigorous youths development programmes to boost the production of their raw materials. This resulted in the establishment of the Nigerian Tobacco Company, PLC Young Farmers Training Programme, Zaria.

Since its inception in 1986, a large number of young farmers have been trained and registered as contract growers. This study assesses the impact of the programme on the beneficiaries.

PURPOSE AND OBJECTIVES OF THE STUDY

The perception of the rural youths on agriculture already exists in the literature. Usually, most authors argue that agriculture is perceived by the youths as an area of occupation that is of no social and economic benefits (Callaway, 1963; Cowan, 1969; Akibode and Osuntogun, 1977).

Ekong (1986) has, however, expressed contrary view and contends that what is true is that the youths are unhappy because they hardly see the prospects of agriculture based on the traditional system of their fore-fathers. If they are guided and find that they have a reasonable chance to begin farming profitably, the great majority would embrace farming as an occupation.

The NTC Training Programme is designed to inject modern farming techniques into young farmers. Although this programme has been in operation since 1986, not much is known about its impact on the beneficiaries. The objectives of this study were therefore to describe the training programme and the characteristics of the beneficiaries; examine their performance in terms of knowledge and use of innovations on tobacco and other crops. tobacco yields in kg/ha and identify and discuss factors that explain differences (if any) in the levels of yields.

METHODOLOGY

The study was conducted in Soba Local Government Area of Kaduna State where the Young Farmers' Training Centre (YFTC) is located. Data for the study were derived from primary and secondary sources. The primary data were obtained by the use of structured interview schedule conducted on 60 beneficiaries and 58 non-beneficiaries between January and May, 1993. The beneficiaries were selected from the overall list of beneficiaries obtained from Nigerian Tobacco Company (NTC) extension management unit through simple random sampling technique. The non-beneficiaries were selected from a list of tobacco growers kept by the NTC, also through the simple random technique.

The secondary data were obtained from NTC extension management unit and records kept by the farmers themselves.

Knowledge and use were measured by 10 selected innovative practices extended to farmers on tobacco and four major crops (cotton, maize, sorghum and millet) grown by the farmers.

The results are presented using frequency counts and percentages, because the nature of the data and the procedure used in data collection were more amenable to these methods.

STUDY FINDINGS

The NTC Young Farmers' Training Programme and the Characteristics of the Respondents

The NTC Young Farmers' Training Programme is coordinated by a Manager who is responsible to the General Manager on matters of Youth Training and extension. Under the Manager are two Assistant Managers with general responsibility for the direction of the instructors. The instructors are responsible for the training of the registered young farmers.

Participants who might be literate or illiterate receive 12 months training in tobacco,maize, sorghum and millet production. In addition, they are taught some aspects of tractor maintenance and animal husbandry. On completion, trainees are issued with certificates of attendance and registered as tobacco contract growers.

The number of NTC field extension activities to the contract growers have grown through the years, until today such activities include improved seeds, fertilizers, transplanting, sowing dates, number of weeding, spacing between holes, insecticides, fungicides, herbicides and drying. The Company also employ well known extension methods - exhibits or demonstrations, field visits, film shows, extension bulletins, and "Master Farmers" - who play the triple role of producing leaf tobacoo as contract growers, serve as local extension agents as well as local buying agents

Tobacco seeds are provided free to participating farmers. All other inputs such as fertilizers, insecticides, fungicides, etc are provided by the Company to the farmers through the Master Farmers. Payment for these services are deferred and deducted from the total worth of the farmers' sale of leaf tobacco.

Table 1 represents the personal characteristics of the farmers. The data revealed that nearly all the beneficiaries (72.9%) of them were 30 years or younger - while only 5% of the non-respondents were within this age. About 63% of the beneficiaries attended full primary education compared with a very small (12%) proportion of the non-beneficiaries. Only 3% of the beneficiaries have no formal education other than Quaranic and adult education.

A majority of the beneficiaries (80%) were small scale farmers cultivating between 1-5 hectares. All the beneficiaries have had previous farming experience before joining the NTC's training programme.

Knowledge and use of practices

Table 2 shows the result of the knowledge of recommended practices related to tobacco production and three other major crops grown by all the farmers. The study shows that a majority of the beneficiaries are aware of the recommended practices for all the major crops they grow. This ranges from a high of about 86.6% knowledge of fertilizers application on cotton to a low of 14.1% for spacing between holes for sorghum. Only about 12% of the non-beneficiaries have knowledge of all the practices on cotton production.

Regarding the use of the practices, the study shows that a fairly high proportion of the beneficiaries who reported knowledge of the practices, applied them on their farms. This ranges from a high of about 100% for fertilizers application on cotton to a low of 66.5% for millet.

Lack of labour was frequently cited by both categories of farmers as major reason why they did not observe sowing dates, and number of weeding. About 45% of the beneficiaries and 36% of the non-beneficiaries who reported not spacing their sorghum as recommended, did so because they find measuring the exact distance between holes complex and labourious exercise to implement.

Yields of tobacco

Tobacco production is the crop that the Company emphasized. The differences in output between beneficiaries and the non-beneficiaries is presented in Table 3. It can be seen that about 81% of the non-beneficiaries produce between 1,000 - 2,000 kg/ha. while a similar large (63%) proportion of the beneficiaries produce above 2,000 kg./ha. These figures suggest that a large proportion of the tobacco is being produced by the beneficiaries of the NTC Young Farmers' Training Programme.

From the findings of the study, emerge a number of factors explaining the differences in their tobacco yields. First, the beneficiaries were still within their productive years and hence could have gone into tobacco production as a means of increasing income to meet their longer life expectations. Similarly, a majority of the beneficiaries possessed the education needed for acquiring the higher skills to enhance productivity. Above all, the study has demonstrated that the NTC type of training is an indispensable tool for enhancing agricultural productivity.

SUMMARY AND CONCLUSION

The study reveals that the Nigerian Tobacco Company (NTC) operates an intensive rural youth training programme. Most of the beneficiaries were 30 years old or younger and have had some farming experiences before joining the NTC, programme.

Most of the beneficiaries use the innovative practices extended to them. All the beneficiaries scored moderately high in the knowledge and use of the ten recommended practices investigated.

All the beneficiaries have increased their output of tobacco production as a result of their participation in the programme.

One significant finding of this study which points to the negative aspect of the contract growers arrangements is the minimal control that farmers have over their tobacco as a result of dependence on NTC for major inputs. For instance, farmers cannot sale their tobacco to any Company of their choice but to NTC, Zaria at a price suggested by the Company.

Although, the study shows an increase in the output of tobacco, it was not certain whether increases in output translates to improvements in profitability and living standards of the contract growers.

It is therefore suggested that a regulatory arrangement that will insulate farmers against undue exploitation by private youth development programmes be put in place.

This study has helped to identify for the attention of policy makers, the critical role of private agencies in agricultural development. Moreover, the results would appear to have a more general relevance to scholars interested in adoption studies. Specifically, the notion that the rural youths can be developed through agricultural training and education, would appear to be supported, at least in part, by the research here reported.

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Table 1: General characteristics of the respondents

Variables		**Beneficiaries**		**Non-Beneficiaries**	
		No.	%	No.	%
Age	21-30	44	72.9	3	5.2
	31-40	16	27.1	24	41.4
	41-50	0	0.0	19	32.8
	Above 50	0	0.0	12	20.6
Sex	Male	60	100	58	100.0
	Female	0	0	0	0
Marital Status	Married	46	76.7	54	93.1
	Single	14	23.3	4	6.9
Household size	1-4	36	60.0	13	22.4
	5-8	22	36.7	29	50.0
	9-12	2	3.3	7	12.1
	Above	0	0.0	9	15.5
Education	No. formal educ.	2	3.3	45	77.6
	Primary educ.	38	63.3	7	12.0
	Above primary educ.	20	33.4	6	10.4
Farm size (ha)	1-5	48	80.0	32	55.2
	6-10	12	20.0	16	27.6
	11-15	0	0.0	10	17.2
	Above 15	0	0.0	0	0.0
Years of farming experience	1-10	30	50.0	38	65.5
	11-20	19	31.7	11	19.0
	21-30	8	13.3	3.	5.2
	Above 30	3	5.0	6	10.3
Years of farming as contract growers	1-3	49	81.7	27	46.6
	4.6	11	18.3	31	53.4

Source: Field survey, 1993

Table 2: Knowledge and Use of Practices

(a) Knowlege of practices

Innovations	Beneficiaries				Non-beneficiaries			
	Cotton %	Maize %	Sorghum %	Millet %	Cotton %	Maize %	Sorghum %	Millet %
Improved seeds	93.0	76.1	58.4	61.0	49.5	74.3	63.1	70.4
Fertilizers	86.6	68.2	76.7	50.9	78.8	79.2	60.3	76.2
Transplanting	59.0	0.1	36.6	68.7	33.7	0.0	12.8	50.6
Sowing Dates	32.4	28.2	31.4	21.8	26.1	21.8	30.0	15.3
Number of weeding	56.1	33.3	39.1	46.0	38.4	32.1	11.6	38.7
Spacing	38.3	15.5	14.1	23.4	12.0	9.9	10.1	10.8
Insecticides	51.3	30.3	29.1	23.8	46.3	15.6	15.6	14.9
Fungicides	56.8	10.6	12.3	6.3	48.1	13.7	11.1	6.3
Herbicides	40.5	40.5	38.6	40.5	40.3	40.1	40.3	38.1
Drying	72.2	11.3	10.8	11.9	61.0	11.6	10.1	11.9

(b) Use of Practices

Innovations	Beneficiaries				Non-beneficiaries			
	Cotton %	Maize %	Sorghum %	Millet %	Cotton %	Maize %	Sorghum %	Millet %
Improved seeds	100.0	84.3	76.1	81.4	63.4	73.6	75.0	42.7
Fertilizers	100.0	98.2	83.5	66.5	80.9	90.1	86.3	67.6
Transplanting	100.0	0.0	11.2	93.1	100.0	0.0	14.1	06.4
Sowing Dates	68.2	46.0	42.7	22.7	56.1	40.6	43.2	22.3
Number of weeding	69.8	30.8	47.1	74.0	69.2	31.0	44.5	72.6
Spacing	72.0	18.8	18.3	19.2	70.2	19.7	11.3	13.4
Insecticides	51.0	2.3	1.8	0.1	22.5	0.1	0.0	0.0
Fungicides	49.4	62.1	70.0	20.1	34.6	61.8	66.1	19.5
Herbicides	2.6	0.0	0.0	0.0	0.8	0.1	0.0	0.0
Drying	73.6	34.7	11.9	4.2	68.3	24.1	11.2	2.6

Source: Field Survey, 1993

Table 3: Yields of tobacco by contract growers

Yields (kg/ha)	Beneficiaries		Non-Beneficiaries	
	No.	%	No.	%
1000-2000	22	36.7	47	81.0
Above 2000	38	63.3	11	19.0

Source; NTC 1992 Wet Season Report.

A Comparative Study of Management Effectiveness under the Training & Visit and General Extension Systems in Ghana

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Abstract

The purpose was to describe and compare the performance of the Training & Visit (T &V) and general extension approaches, as perceived by district extension officers in four regions of Ghana. A survey research design was used. Fifty two district extension officers representing the two extension approaches were administered a questionnaire to measure their perceptions of extension performance. T-tests and analysis of variance were used to compare group means. The results indicated that, overall, there were no significant differences between T & V and general extension approaches. Communication skills was identified as the main subject respondents needed training. The claim that T&V enhances extension management effectiveness was not proven. It is important to address the communication training needs before the T&V system can be replicated in other regions in Ghana and elsewhere.

Introduction

One of the most effective means of transforming Africa's potential agricultural resources into sustained agricultural development is through an effective extension system. Improved agricultural extension management system is recognized "as a central mechanism to achieving increased food production through technology transfer" (Food and Agriculture Organization, 1990, p. 45). African governments and international aid agencies have promoted and supported new extension approaches to help small-scale farmers increase food production. The Training and Visit (T&V) system has been the latest extension method to be promoted. T&V seeks to replace the general (or traditional) extension system which has been in use in many developing countries since independence.

Montague Yudelman (1984), a former director of World Bank's Agricultural and Rural Development Department, stated that the T&V system:

> Provides a sound institutional framework for reaching large numbers of farmers, and it has many elements that can be adapted to be effective in a range of different of different environments. T&V is based on a set of managerial and organizational principles that are of broad applicability and which, when applied together, constitute an extremely powerful managerial tool. (p. vii)

By 1988, over $2 billion dollars were channeled into T & V extension programs in developing countries (FAO, 1990).

Distinguishing T&V from the General Extension System

Before examining the research problem in Ghana, it is necessary to examine the main distinguishing elements between the general extension and T&V systems.

General Extension Approach

The general extension approach is practiced mainly by agricultural ministries of developing countries. The main goal is to increase the agricultural production of subsistence farmers. Since a subsistence farmer grows different crops, such as maize, millet, and rice and keeps different livestock, such as cattle, sheep, pigs and poultry, the extension agent is expected to be expert in these areas. In addition, the extension agent, as the only government representative in the village, is often asked to perform other functions, such as inputs distribution and tax collection (Swanson, et al., 1990; Boone, 1989).

Although the general extension system is still popular, it has serious deficiencies. These include the lack of adequate and well-trained extension workers; the lack of participation by small farmers in extension decision-making; poor extension/research linkages; the lack of adequate infrastructural and other support facilities; and above all, poor management (FAO, 1987).

Training and Visit (T&V) System

The T&V system was designed to improve extension by eliminating deficiencies of the general extension system. It is promoted mainly by the World Bank, which has invested over $2 billion in T&V extension activities worldwide (FAO, 1990). Other development agencies like United Nations Development Program (UNDP), International Fund for Agricultural Development (IFAD), the United States Agency for International Development (USAID) and FAO, have used aspects of the approach in their projects (FAO, 1990).

Like the general extension approach, T&V seeks to benefit small farmers by urging them to adopt technological innovations, usually selected for them by the funding agency. Unlike the general extension system which seeks to develop all aspects of rural farm life, T&V extension focuses on specific crops. T&V also differs from the general extension approach by its emphasis on frequent in-service training for extension personnel, regular visitation to farmers' farms, promotion of extension/research linkage and improved extension management (Benor et al., 1984). The main goal of T&V is the transformation of the extension administration (Gustafson, 1990).

The Training and Visit System of Extension in Ghana

Ghana is one of over 60 countries now using the T&V system of extension. Like many developing countries, Ghana adopted the T&V system because of its promise of improving extension management--the key to increased agricultural production and national development. The Upper Region (now Upper East and Upper West regions) was the first to adopt the T&V system in Ghana in 1978. Ghana obtained a World Bank loan that year to implement the Upper Region Agricultural Development Program (URADEP) and T&V was a component of that loan package. The Volta Region also adopted the T & V system when Ghana obtained another World Bank loan for the Volta Region Agricultural Development Program in 1981. There are attempts to replicate the T&V system in the remaining seven regions of Ghana in the form of more agricultural development loans (MOA,1990). The question is whether agricultural development is occurring in Ghana as a result of these loans. More specifically, is T&V improving extension management in Ghana? Are the claims that T&V has been a better way of: (a) utilizing limited resources effectively; (b) increasing farmer participation; (c) improving agents' professional skills; and (d) providing adequate monitoring, supervisory and support services; justified in the two regions of Ghana where the T&V system has been in use for over 14 years?

Purpose and Objectives of This Study

The main purpose of this study is to determine if the T&V system is better than the general extension system in developing management effectiveness. The specific objectives of the study were:

1. To identify demographic characteristics of district agricultural extension officers in the general extension and T&V systems;

2. To describe officers' perceptions of extension performance of T&V and general extension systems; and
3. To compare the effectiveness of the general and T&V extension systems on the following indicators: training, research-extension linkages, farmer participation, logistics and support services, extension methods, and resource allocations.

Research Methodology

The target population frame for this study was established from the 1992 Personnel Directory of the Extension Service of Ghana's Ministry of Agriculture. A purposive sample of 52 district agricultural extension officers was selected from the Western, Central, Upper East and Volta regions.

The Central and Western regions practice the general extension approach whereas the Upper East and Volta regions practice the T&V system. Of the 52 respondents selected, the Central region had 15, Western region 13, Upper East 10 and Volta region with 14.

A descriptive research design, with a correlational component, was used to identify current practices and make comparisons regarding performance of the T&V and general extension approaches. The research hypothesis was that perception scores of T&V extension officers would be significantly greater than the scores for the general extension officers.

A questionnaire was developed to identify performance indicators, and collect perception data from participants. The questionnaire had two sections. Section I had items covering demographic and job characteristics of extension officers, such as gender, years in the Extension service, region, district, highest educational level, and in-service training. Section II contained 81 items on officers' perceptions of the performance of the two extension approaches. Extension performance was represented by six indicator variables: (a) adequacy of training; (b) research-extension linkages; (c) farmer participation; (d) methods used; (e) logistics; and (f) conditions of services (Campbell, 1976 and Howell, 1988).

A set of items were used to determine respondents attitudes for each variable. Likert-type scales, ranging from 0 to 5 were used. High perception scores indicated more favorable attitude. For some items perception values scored ranged from 1, "very low" to 5, "very high."

There are two reasons favoring the use of opinions and perceptions in survey research. One is that perceptual data are easier and less costly to collect. The other is that there is a positive correlation between perceptual data and objective facts (Forgus & Melamed, 1978; Bennett (1979). As a result, perception scores can be used to compare performance in different organizations (Campbell, 1976).

A panel of experts, comprised of five faculty members and four graduate students, was used to establish suitability and content validity of the instrument. A small group of extension staff also reviewed the instrument and offered valuable suggestions on content. A pilot test for reliability was conducted with a sample of extension officers and agents in Greater Accra Region, using a test-retest procedure (Fraenkel & Wallen, 1990). The reliability score was $r = 0.79$.

The questionnaire booklets were personally sent to officers to control nonresponse error. Discussions were held with agricultural officials in each region to clarify responses, and to obtain information to augment what is obtained from the formal interviews. The population list was purged of duplicates to avoid frame error. Of the 52 subjects selected, 51 responded yielding almost 100 percent response rate.

Data Analysis

Data was organized in a database setup and analyzed by a Statistical Package for the Social Sciences (SPSS-PC) statistics software. Descriptive statistics, such as frequencies, percentages, and measures of central tendency were calculated for each variable. Group distributions of officers by gender, level of formal education and years of experience were calculated. Means and standard deviations were also calculated to describe groups. Finally, T-test and ANOVA calculations were done to determine group mean differences. A null hypothesis of no difference between the means of general extension and T&V groups was used, based on a priori alpha level of 0.05 for each test of significance.

Results

Results of this study are presented as follows:

A. Respondents' Characteristics

Results of the demographic data showed that the following characteristics:

- Majority of respondents were male (76.5%).
- Twenty four extension officers (47.1%) had Diploma certificates
- Twenty-five (49.1%) had at least a college degree, including six people with Master's degrees in agriculture.
- The majority of respondents (51%) had worked for Extension between 2 and 10 years.
- Tweleve percent of respondents for over 20 years in Extension.

Table 1 shows the distribution of respondents and their characteristics in the two extension approach groups. T&V district extension officers had more in-service training than general extension officers. T&V extension officers also averaged 13 years of experience whereas general extension averaged 10 years. Over 60% of T&V respondents served more than 11 years; 63 percent of general had served between 2 and 10 years.

Table 1. Characteristics of respondents by extension approach*

Characteristic	General Ext. Approach Frequency*	%	T & V Approach Frequency	%
1. Gender				
Female	6	22.2	6	25.0
Male	21	77.8	18	75.0
2. Educational Level				
School Certificate	2	7.4	0	0
Diploma (Agric.)	12	44.4	12	50.0
BSc. (Agric.)	9	33.3	10	41.7
MSc. (Agric.)	4	14.8	2	8.3
3. Years of service				
Up to 10	17	63.0	9	47.5
11 - 15	7	25.9	12	50.8
≥ 20 years	3	11.1	3	12.5
Mean (years)	10.1		13.3	
sd.	7.2		5.1	
4. In-service training				
Up to 10 days	14	51.9	9	37.5
11 - 20	6	22.2	12	50.0
≥ 20 days	7	25.9	3	12.5
Mean	16		14	
sd.	6.5		3.2	

* For General extension, n = 27; T&V, n = 24. Total percentage = 100.

B. Performance Indicator scores.

Table 2 shows sample means and standard deviations for the six composite performance indicators. Overall, district extension officers perceived extension performance as low. There were no significant differences between the two extension systems on all six indicators.

1. Adequacy of job skills.

T&V and general extension officers did not differ significantly on job skills ratings, the mean scores were 2.64 and 2.67 respectively. Respondents were relatively knowledgeable in extension principles, staff evaluation, and program scheduling. However, the mean scores indicated a need for improvement. Officers perceived a need for training in communication skills, especially in the use of audio-visual equipment.

2. Research-Extension linkages

Research-extension linkage is a measure of extension administrators' access to information. The composite indicator scores for T&V and general extension administrators were rated low. The mean scores were (Mean=1.58) and (Mean=1.35) respectively. Joint research-extension activities in training programs, joint technology trials and field days items were all rated low ($.67 < \text{Mean} < 1.82$). General extension respondents rated access to University researchers significantly higher than T&V officers ($1.52 > .67$), $p < .05$, This may be due to the fact that general extension administrators studied stay close to the University of Cape Coast.

3. Farmer participation

The two extension groups were not significantly different on degree of farmer participation. However, general extension respondents differed significantly from T&V respondents on: fertilizer application ($3.19 > 2.47$), $p < .05$; storage methods ($3.72 > 2.91$), $p < .05$; and farm management ($2.96 > 2.50$), $p < .05$. On fertilizer use, fertilizer storage and farm management, and ability to involve farmers general extension respondents scored higher than T&V respondents.

4. Methods and media used

"Methods and media used" items referred to the level of effectiveness of extension administrators in "teaching methods," "audiovisual equipment" and "design and implementation of extension campaigns." General extension officers rated extension methods higher than T&V officers ($2.41 > 2.13$).

Table 2. Extension performance indicator mean scores

	GENERAL*		T & V		
Indicators	Mean	sd.	Mean	sd.	t-value
1. Adequacy of job skills	2.67	.58	2.67	.65	0.1
2. R - E linkages	1.54	.88	1.35	.80	0.8
3. Farmer participation	2.87	.62	2.69	.64	1.0
4. Method/media use	2.41	.60	2.13	.52	1.8
5. Support services	2.21	.84	2.46	.67	1.2
6. Service conditions	2.35	.81	2.17	.56	0.9

* For general extension, n = 27; T &V, n = 24.

T&V officers rated use of contact farmers as an effective extension method than general extension officers ($3.80 > 3.33$), $t(49) = 2.2$, $p < .05$.

5. Logistics/support services

The T&V and general extension groups rated logistical support as moderately adequate. T&V respondents had higher mean ratings than general extension respondents on all seven items that constituted the performance indicator. These were: (a) staff supervision, $3.10 > 2.78$; (b) specialists' support, $2.88 > 2.60$; (c) monitoring and evaluation support, $2.67 > 2.40$;

(d) secretarial services, 2.63 > 2.04; (d) office supplies, 2.58 > 2.54; (e) general transport, 2.33 > 2.15; (f) audio-visuals support, 1.10 > .89 for T&V and general extension respondents respectively.

6. Service conditions

Both T&V and general extension groups rated financial allocation for services low. The mean scores were 2.35 and 2.17 for general extension and T&V respectively. However, the T&V group rated salaries and vehicle financial allocations adequate whereas general extension staff did not. Adequacy of financial resources for in-service training and workshops were rated moderately high by both groups.

Discussion and Conclusions

The results of this study indicate the lack of significant difference between the general and T&V extension organizations in terms of performance effectiveness. Each group rated extension performance low Services conditions, effectiveness of teaching methods, ability to involve farmers in decision making and management training skills have not improved under T&V. For instance, T&V officers attended more in-service training but their management skills have not improved. In-service training focused primarily on technical agricultural subjects at the expense of communication and adult education skills.

Farmers' participation in technology transfer programs under T&V did not differ from that of general extension. The principle that extension workers must concentrate on information dissemination exclusively of input distribution has not been justified (Benor & associates, 1984; Gustafson, 1990; Kingshotte, 1980). Farmers participate in extension activities when they expect to obtain usable technical advice. Technical advice is most useful to farmers, and easily adopted when combined with access to key related services and inputs (Bryant & White, 1982).

Extension/research linkages were also rated low, thus meaning that the claim that T&V enhances this linkage had not been proven. Research-extension linkage in Ghana may be constrained by the fact that extension and research were located in separate ministries. Crop research institutes, for example, are under the Ministry of Science and Technology, whereas Extension is under the Ministry of Agriculture. District extension administrators need coordination and communication skills to interact effectively between these organizations. Extension organizations in Ghana also do not utilize the information available at research centers. Again, it will take a person skilled in communication to link researchers and extensionists.

The results of this study confirm the criticisms that the T&V approach has not improved extension performance (Howell, 1988; Roberts, 1989; Israel, 1987). The generous allocation of funds to T&V projects ensured better salaries, vehicles and other costly infrastructure as a basis for enhancing performance. However, converting these resources into actual results proved elusive. The mixed results also reflect the negative "withdrawal" effects associated with well-funded but short-lived agricultural development programs in Africa (Roberts, 1989).

For an Extension organization to improve its performance, a continuous and systematic evaluation of its activities is necessary. When expensive pilot projects like T&V are introduced into a developing country, they must be tested for their costs and long-term viability under local conditions. This study proved that the T&V system had not improved extension effectiveness in those regions of Ghana were it had been tried. Therefore, the strategy should not be replicated in other regions unless the communication skills problem is addressed. "The purpose of experimentation is not only to demonstrate the virtues of the new system, but also to work out problems and adapt the system to the realities of the regional or local conditions" (Hage & Finsterbusch, 1987, p.111). The Ghana Government and the World Bank may learn from this study.

Recommendations

Based on this study, the following recommendations are made:

1. Extension administrators should include communication skills training T&V programs.
2. Development support communication is an effective way of providing communication training for extension workers and should be adopted.
3. The agricultural universities in Ghana should become more practically involved in extension work as a way of improving extension/research linkages.
4. Future studies on farmers' perception of extension effectiveness could strengthen this study and should be pursued.

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MOBILIZING RURAL YOUTHS FOR A CAREER IN FARMING: LESSONS FROM AN NGO's APPROACH IN NIGERIA

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Introduction

One of the most serious problems facing agricultural development in developing countries particularly in sub-saharan Africa in recent times is the ageing farm population and lack of interest among youths in farming. Inspite of the relative resilence of the rural sector of these countries for labour absorption, the drift among the rural people to the urban sector for white-collar jobs remains unabated. In Nigeria, most attempts to stem the tide of rural urban drift among rural youths has been that of government alone. Since independence many programmes aimed at encouraging rural youths to take up farming as a life-time career have been introduced. Among them are the farm settlement schemes introduced in the then Western and Eastern Nigeria; the National Directorate of Employment (NDE) School Leavers Agricultural Scheme, and the School-to-Land Programme introduced by some states in the early nineteen eighties. Most of these programmes have recorded very little success mainly because not much was done to demonstrate to the youths that farming can be rewarding and profitable life-time career.

In 1987 a non-governmental organization (NGO) the Leventis Foundation, Nigeria introduced a programme aimed at mobilizing rural youths and settling them as farmers. Two Agricultural

Training Schools were established in different agro-ecological zones. One at Ilesa, Osun State in the Humid region of Nigeria and the other at Dogondawa, near Zaria, Kaduna State, in the sub-humid region.

Purpose and Objective

The purpose of the study reported in this paper was to do a follow-up on the ex-trainees of the Leventis Foundation Agricultural School and evaluate their performance as farmers. The specific objectives were to;

1. identify the background and the socio-economic characteristics of the ex-trainees and examine their attitude to farming;
2. determine their performance in terms of the use of agricultural innovations, farm productivity and application of modern farm management techniques in farming;
3. derive lessons that can be learned from the concept, organization and management of the programme for more effective mobilization of rural youths for agricultural and rural development in Nigeria and other developing countries.

Methodology

The primary data for the study were obtained from ex-trainees of the Leventis Foundation Agricultural School residing in Kaduna State, Plateau, Katsina and Kano States through questionnaires mailed to them through the School Administration between March and June, 1992. A total of 150 ex-trainees were surveyed. Other data were obtained from the two schools, at Dogondawa and Ilesa.

The School's Programme

The main objectives of the programme are to train young Nigerian small-holder farmers in modern farming practices, including the maintenance and repair of agricultural tools and equipment, and to assist in the establishment of technically sound, commercially oriented family farms thereby contributing to the country's self sufficiency in food and cash crop production.

The Ilesa School includes a 234 hectares of farmland on lease to the school by the Osun State government for a period of 20 years. That of Dogondawa includes a 100 hectares farmland on lease to the school for a period of 30 years. The school programme includes a balanced mix of theoretical and practice work consisting of crop production, animal production, agricultural engineering, farm management, agro-forestry, food processing and preservation. Model farms of various sizes are also established in each school, representing models of organization and management of small and medium scale family farms.

The duration of the training programme is one year within which a trainee acquires adequate knowledge and skills in various phases of agricultural production. Some inputs with which to start off and settle as a farmer are acquired by the trainees during training.

The School maintains a linkage with the ex-trainees, providing them free farming advisory services. It also have linkages with State Ministries of Agriculture, Universities and Research Institutions. The school also maintain linkages with the International Institute of Tropical Agriculture (IITA), Ibadan, United Nations Development Programme (UNDP) and the American Farm School, Thessaloniki, Greece.

Findings and Conclusions

Data in table 1 show that all the ex-trainees surveyed were within the age bracket of 21 - 30 years. Eighty four percent of them were males while 16% were females, about 46% are married while the remaining are single; over 80% of them had at least secondary education; all of them had a rural background; 90% were unemployed before joining Leventis Foundation School (L.F.S.) while about 10% of them were practising farming on a small scale.

The average farm holding was 4.6 hectares which is generally above the average for subsistence level cultivation. The mean gross farm output per hectare (see table 3) for the major crops grown were 1159.5kg for cowpea, 2107.3kg for sorghum, 2003kg for maize, 1201kg for millet. The gross income of the L.F.S. graduate from farming in the year of the study ranged between ₦5,000.00 and ₦27,000.00. The mean farm income was ₦16,850.00. These were mainly from crop production and livestock production. Over 90% of the graduates have crop production as their major enterprise, although almost all of them are engaged in the production of livestock as a subsidiary activity.

The mean output per hectare of most crops grown by the ex-trainees was at least 18% higher than what is obtained among traditional small scale farmers. Although all the ex-trainees used a wide range of innovative practices in farming such as seed dressing, improved seeds, and fertiliser, about

86% of them still frow their crops in mixture like the traditional small scale producer. Resources given by them for growing crops in mixture include maximization of land resource utilization, insurance against total crop failure weed control and as a routine practice in farming.

All the ex-trainees kept records of farming activities, a detailed farm plan and budget and belonged to one association or the other.

An unstandardized attitude instrument designed and administered to the ex-trainees to examine their attitude towards farming yielded the following results;

a) Sixty-seven percent of the ex-trainees indicated that their training at L.F.S. altered their traditional perspective on farming and now see farming as a profitable career for young people. The remaining 33% did not see farming as profitable as other occupations particularly, merchandizing and white collar job.

b) Ninety-two percent of them indicate a willingness to settle down permanently as full-time farmers while the remaining 8% believe that they are in farming as a stopgap measure, or intend to continue to practice farming on a part-time basis.

c) Sixty-five percent of the respondents would encourage other young people to take to farming while the remaining 35% would not encourage other young people to take to farming.

Generally, the attitude of these young farmers towards farming appear to have improved as a result of their participation in farming.

Other important findings of this study from the records of the two schools both at Ilesa and Dogondawa indicate that youths in these areas have shown considerable interest in the L.F.S. programme and that the activities of the young farmers in their communities have started to influence other young people to take to farming. A significant development is the tremendous interest shown by female participants in the programme. At the Ilesa school for instance, it was reported that the best farmer of the year for 1991 was a lady.

Lessons

1. One of the reasons for failure of most past efforts at mobilizing youths for a career in farming in Nigeria is that most of such efforts were directed at settling urban youths for a life in the rural sector. The Leventis Foundation Programme encouraged only rural young people who had background in farming and have at least 3 hectares of land to return to after training.
2. Timely availability of production inputs particularly fertilizers, agro-chemicals and credit are major constraint to the development of traditional agriculture in Nigeria. The programme at Leventis Foundation Agricultural School emphasized self-reliance, low-external-input sustainable farming, and encouraged the young farmers to generate a substantial portion of the capital needed to start farming after training. The school administration also linked the ex-trainees with financial institutions and have instructions on how to obtain and manage credit for profitable farming.
3. The Leventis Foundation School Programme also demonstrates that with proper training and motivation rural young people would develop a positive attitude and willingly settle for a career in farming.

Table I

SOCIO-ECONOMIC CHARACTERISTICS OF GRADUATES OF L.F.S.

Characteristics	Number of Respondents	% of Respondents
Age		
21-25	120	80.0
26-30	30	20.0
Sex		
Male	126	84.0
Female	24	16.0
Marital Status		
Married	70	46.3
Single	80	53.7
Educational Level		
Primary	20	13.3
Secondary	125	83.3
Post-Secondary	5	3.4
Background of Family		
Rural	150	100.0
Urban	0	0.0
Farm Size & (ha.)		
0 - 3	30	20.0)
4 - 6	100	66.7)Mean 4.6ha
7 - 9	15	10.0)
10& above	5	3.3
Gross Farm Income		
₦5,000-₦9,000	12	13.3)
₦10,000-₦14,000	60	40.0)mean Income
₦15,000-₦19,000	72	48.0)₦16,850.0
₦20,000 & above	3	1.7)
Membership in Assoc.		
Members	140	93.3
Non-Members	10	7.7
Occupation before Joining L.F.S.		
Farming	15	10.0
Unemployed	135	90.0

* In 1992, the average exchange range of Nigeria's curency was about $1 = N20

Table 2: Distribution of Respondents According to use of innovative practices

	Innovation/practice	No. of Respondents	%
1)	Seed dressing with chemical before planting	150	100.0
2)	Improved seeds	150	100.0
3)	Fertilizer	125	83.3
4)	Spraying of cowpea with insecticides	140	93.5
5)	Sole cropping	20	13.3
6)	Mixed cropping (unrecommended)	130	86.4

* Although a lot of work has been done by research on appropriate crop mixtures in several locations in Nigeria, in most of the ecological zones research has not come up with specific recommendations for crop mixtures which can be adopted by farmers.

Table 3: Average output of major food crops per hectare among L.F.S. graduates compared with average output among small-scale holders across the country.

Crop	Average output/hectare by L.F.S. graduates	Average output on traditional small-scale farms
Maize	2003kg	800kg
Cowpea	1159.5kg	350kg
Millet	1201kg	600kg
Guinea corn/ sorghum	2003kg	700kg

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Maize	2,003kg	800kg
Cowpea	1,159.5kg	350kg
Millet	1,201kg	600kg
Guinea corn/ sorghum	2,003kg	700kg

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